STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

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As the Editor Views the News

CONVENTION goers are hearing much about the social obligations of industry. Last week Dr. James R. Angell, president of Yale university, told members of the American Society of Mechanical Engineers that we are morally bound to see to it that all parts of the community are protected . . . from any ill-advised consequences" which may flow from engineering achievement. He then questioned whether "mankind has yet achieved the mentality and moral fiber" to make the great contributions of technological progress "really significant in value." He thinks the great task of today (p. 26) lies more in the field of morals than in that of "engineering and economics narrowly conceived."

• • •

Human Factor Bars Success

This view should strike a responsive chord among progressive leaders in industry, many of whom have realized for years that much that we would like to accomplish in economic and social progress is blocked by the shortcomings of human nature. In the twenties, when government and industry were trying to adopt fair trade practice agreements on a voluntary basis, the effort failed largely because too few of the industrial executives involved possessed the intelligence or the moral fiber required for co-operative success. Again in the case of NRA, where compulsion supplanted voluntary action, failure was due chiefly to the human element.

• • •

Man Failure Killed NRA

Lack of competence throughout the scale of human beings is one of our basic problems. From deficiency in leadership at the top to hopeless inability to perform even simple tasks of common labor at the bottom we find serious handicaps which must be removed before we can reap the full reward of our engineering and economic achievements. We need individuals of higher caliber in positions of high responsibility and we should raise the standards of intelligence and ability of the unfortunate "unemployables" in the lower scale of our population. Clearly, education and training have not kept pace with our advance in material accomplishments. Our modern world imposes upon the people tasks much more exacting than those confronted in the days of simple living. We believe Dr. Angell is right. The nation should give more attention to improving the quality of its personnel.

• • •

Many Workmen Lack Training

In industry, the problem of competency is accentuated by the recent suggestion by President Roosevelt that employers attempt to hire more men to relieve the WPA and other government payrolls. The difficulty in acceding to the President's wishes lies in the fact that thousands of workers on relief or in temporary government work are totally unfitted for the jobs that are available in industry. It is inevitable that we in the United States must learn, as England learned, that the rehabilitation of great masses of unemployed involves instruction and training for useful service. Acute shortages of labor for certain skilled jobs will force prompt action in this respect.

• • •

Future Bright for Diesels

If, as some observers believe, the next bottleneck in steel producing facilities is going to be experienced in a lack of soaking pit capacity, then the industry is due for expanding activity in the construction of these units. In this connection, Inland Steel's new-blooming mill will command attention (p. 46) because it is served by circular soaking pits of interesting design. . . . An eastern manufacturer, who several years ago installed high tiering stacking trucks for handling boxes of tin plate (p. 51), finds that no cases of hernia have been reported by employes since the mechanical lifting devices were introduced. . . . A host of authorities, citing the trend of power development in important industries (p. 72), conclude that the use of the diesel engine is in its infancy and that a bright future in marine, railroad and aviation applications lies ahead.

E. L. Shaner

Technical Advances Give Engineer Social Obligation

SOCIAL responsibilities of the engineer, with his contributions to technical advancement, were stressed at the fifty-seventh annual meeting of the American Society of Mechanical Engineers in New York, Nov. 30-Dec. 5.

These responsibilities were recognized in discussions on management and personnel problems and were referred to by Dr. James A. Angell, president, Yale university, New Haven, Conn., in his 1936 Towne lecture, which this year commemorated the ninetieth anniversay of the birth of George Westinghouse.

Dr. Angell said that the recent election indicated a certain trend "to regard as all important the efforts of commercial and industrial methods on large groups of our human brothers, as properly and inevitably the subject of general, special and political consideration."

Ambrose Swasey, founder and chairman, Warner & Swasey Co., Cleveland, who on Dec. 19 will celebrate his ninetieth birthday. was awarded the Hoover gold medal at a dinner in his honor. The occasion also featured the Thurston lecture and Ambrose Swasey Eulogium, "Ninety Years of Stellar Exploration," by Dr. Harlow Shapley, director, Harvard observatory, Cambridge, Mass. An address was made by Herbert Hoover.

Award for Achievement

The Hoover medal, administered by representatives of the American societies of mechanical, civil, and mining and metallurgical engineers, is awarded annually for notable achievements in engineering. The medal commemorates the civic and humanitarian achievements of Mr. Hoover, first recipient of the award. Mr. Swasey had previously received the John Fritz and Franklin gold medals, the Washington award, and a commission as officer of the French Legion of Honor.

James H. Herron, president, James H. Herron Co., consulting engineers, Cleveland, was elected president to succeed W. L. Batt, president, SKF Industries Inc., Philadelphia. James M. Todd, consulting mechanical and electrical engineer, New Orleans. James A. Hall, professor of mechanical engineering, Brown university, Providence, R. I., and R. J. S. Pigott, chief engineer, Gulf Research & Development Corp., Pittsburgh, were named vice presidents. E. W. Burbank, district manager, Allis-Chalmers Mfg. Co., Dallas, Tex.; Kenneth H. Condit, editor, *American Machinist*, New York; and S. W. Dudley, dean, school of engineering, Yale university, New Haven, were elected managers.

George A. Orrok, consulting engineer, New York, was awarded an honorary membership for his outstanding contributions to the engineering profession in the power field.

James H. Herron
Elected president, American Society of Mechanical Engineers

Edward Bausch, Bausch & Lomb Optical Co., Rochester, N. Y., was presented with the A.S.M.E. medal "for meritorious mechanical developments in the field of optics."

The Worcester Reed Warner medal went to Charles M. Allen, professor, Worcester Polytechnic institute, Worcester, Mass., for his early and continued hydraulic laboratory work and for the permanent value of the papers on his development of methods of testing large hydraulic turbine installations.

The Meville medal was awarded to H. A. Stevens Howarth, Kingsbury Machine Works Inc., Philadelphia, for his paper "The Loading and Friction of Thrust and Journal Bearings with Perfect Lubrication."

Commenting on social responsibilities, Dr. Angell said: "One of the conspicuous facts about mechanical inventions is that they may occasion large-scale dislocations of labor with periods of unemployment which compel society to step in and in one form or another assist in the economic adjustment.

"The time has long passed when we can look upon these developments as simply interesting eccentricities exercising purely local effects. When we are willing to accept the benefits which engineering progress brings to us in the form of cheaper and better raiment and such light blessings, we must be willing to see to it that our neighbors are not compelled to pay in poverty and suffering for the advantages which we enjoy.

"So long as we issue patents and protect the holders and permit them to manufacture their labor-saving devices and goods which flow from them, we are morally bound to see to it that all parts of the community are protected, as well as the patenter from any ill-advised consequences which may flow from his industry and his intelligence."

The speaker questioned whether "mankind has yet achieved the mentality and a moral fiber to make all of these great contributions really significant in value.

"This line of consideration reduces itself to the ethical truism that no fact taken by itself is necessarily either good or evil, but invariably depends upon the purpose to which it is put and the results which emanate from its use.

"In this sense, I think it must be admitted that the great task of our day and generation lies more in the field of morals and even religion than the field of engineering and economics narrowly conceived.

Westinghouse Pioneered Trail

"Most of us believe that great engineering victories of men like Westinghouse, constitute a blazing challenge to us to build a social order able to incorporate in itself all these blessings, while safeguarding the finest values that inhere in the human spirit."

In commenting on Mr. Westinghouse's achievements Dr. Angell declared that his interests were first directed to problems of transportation and that through all of his life his accomplishments had direct or indirect relation to issues of that character.

"It is perhaps an indication of the close dependence of all parts of our mechanical age upon one another that, starting with this initial concern for transportation, he should have devised techniques which are sufficient far beyond the boundaries of their original purposes." As far as the public is concerned, Dr. Angell said, the air brake easily stood first among Mr. Westinghouse's contributions.

Mr. Westinghouse, his career and engineering achievements were also eulogized at a forum in which 15 men participated, including Dr. C. F.

Scott, Yale university; Ralph Buff, president, Chicago, Burlington & Quincy railroad, and Thomas Campbell, oldest employe of the Westinghouse Air Brake Co., who had known Mr. Westinghouse personally.

Retiring president Batt confined the remarks in his address almost entirely to organization matters of the society. He spoke of the good work being accomplished by the professional divisions and technical committees and urged close co-operation of the local sections of the society throughout the country with other engineering groups in their respective localities. He regarded the work of these sections with student branches as of real value—in fact, an outstanding accomplishment of the society, as it stimulated professional interest in the engineering student.

Favors Regional Conferences

Mr. Batt believed that the local sections could continue to be of marked service in assisting unemployed engineers in obtaining work. He also regarded the new organization of regional conferences as a considerable improvement over the previous plan, asserting that it promises contributions of real value toward a closer unity within the society.

A broad program of modernization confronts railroads here and abroad according to a report by the railroad division of the society. The extraordinary rise in average speeds frequently taxes equipment to limits where repair costs rise rapidly. Many locomotives now are overworked and are unable to make up time in case of delays. Railroad

(*Please turn to Page* 71)

Machinery Makers Still Face Vast Pent-up Demand

POTENTIAL demand for machinery today is possibly even greater than in 1935, when a survey by the Machinery and Allied Products institute, Chicago, showed American industry needing $18,500,000,000 worth of machinery to replace worn out or obsolete equipment, said John W. O'Leary, president of the institute, in an interview with STEEL last week.

Although there has been a sharp upturn in capital goods production since that time it is doubtful if replacements have kept pace with obsolescence, especially since activity in consumer goods manufacturing has risen almost to the normal level without machinery replacements rising correspondingly, according to Mr. O'Leary.

"Production figures for capital goods industries usually are not separated from those for consumer goods," pointed out Mr. O'Leary. "A widely accepted source of such data, however, shows consumer goods production at 98.5 per cent of the 1926 level and capital goods production at 81.7. In 1929 both groups were well over the 100 per cent mark.

"America is geared to progress rather than to a static condition. Even when all manufacturing production reaches the 1929 level it cannot be considered 'normal' for 1936 or 1937. Population today is about 6,000,000 greater than in 1929, and to maintain the same per capita production a figure several per cent higher is necessary.

"Between 1899 and 1929 industrial production rose more than 200 per cent, according to the United States census of manufactures. The rise was at an accelerating rate—being as great in the last ten years as in the preceding 20. All of this indicates that the production of machinery and similar capital goods products must rise greatly above the present level. Heretofore periods of low production have been compensated for by following periods of greater than normal gain. If history repeats itself the demand for machinery and similar products should in the future be far above the 1929 level.

Reserves Will Be Smaller

"The principal new handicap to the machinery industry is the corporation surplus tax which will probably prevent many manufacturing corporations from retaining sufficient reserve funds to replace worn out and obsolete equipment and to expand their plants. The subject of depreciation reserves in relation to the new tax measure is of extreme importance not only to machinery manufacturers but to the users of

NINETEENTH anniversary of the birth of George Westinghouse was commemorated at the annual meeting of the American Society of Mechanical Engineers in New York last week. Fourteen of America's leading engineers recounted the career and engineering achievements of the great inventor-industrialist who died in 1914.

Front row, left to right: L. B. Stillwell, consulting engineer, Princeton, N. J.; W. W. Nichols, assistant to chairman, Allis-Chalmers Mfg. Co., New York; F. W. Smith, president, New York Edison & Consolidated Edison Co., New York; W. L. Batt, president, SKF Industries Inc., Philadelphia, and retiring president A. S. M. E.; J. V. B. Duer, chief electrical engineer, Pennsylvania railroad, Philadelphia; S. M. Vauclain, chairman, Baldwin Locomotive Works, Philadelphia.

Back row, left to right: J. F. Miller, vice chairman, Westinghouse Air Brake Co., Pittsburgh; N. W. Storer, Westinghouse electric railway engineer, Pittsburgh; Thomas Campbell, Westinghouse Air Brake veteran, Pittsburgh; Francis Hodgkinson, consulting engineer, formerly turbine expert for Westinghouse, New York; A. W. Berresford, past president, American Institute of Electrical Engineers, New York; C. R. Beardsley, superintendent of distribution, Brooklyn Edison Co., Brooklyn, N. Y.; R. V. Wright, editor, *Railway Age*, New York; C. F. Scott, professor of electrical engineering emeritus, Yale university.

machinery as well. A committee of the Machinery Institute, headed by Eugene C. Clarke, president, Chambersburg Engineering Co., Chambersburg, Pa., has devoted several months of intensive study to current depreciation reserve policies of manufacturing corporations and to methods of improving present practices in view of such recent developments as the 1935 revenue act. Every possible effort is being made to acquaint industrialists with the findings and recommendations of this committee.

"There are indications in scores of industrial centers throughout the nation that a shortage of skilled labor exists in the mechanical trades. This, however, should not be looked upon as a new, alarming problem but rather a welcome opportunity for machinery manufacturers to train competent workers and provide jobs for worthy men. A skilled labor shortage is normal in times of prosperity and apprentice training must be carried on by industry to meet it.

"The danger of legislation curbing industrial freedom will be as great in 1937 as in the past, and the greatest need to overcome it is an enlightened public opinion—acquaintance of the public with industry's aims and appreciation of its contributions.

Industry Source of Wealth

"The only true source of jobs and income for the people of the country is business and industry. Government can promise livelihood to millions, but it has nothing to give but what it gets or takes from the business, industrial, and agricultural enterprises of the country which create all wealth. Because the national government is far away and mysterious, many believe it has some new power, new talent, for providing the necessities and luxuries of life—some new formula to displace ordinary creative work. It is the job of business men and industrialists, individually and through their organizations, to convince the public that the only way back to prosperity for all is through increased production—to convince the average man that increased production does mean more jobs, more money, and more goods at lower prices.

"Co-operation growing out of this realization will create prosperity for machinery manufacturers, all industry, and the nation as a whole."

Pension Cut Restored

Jones & Laughlin Steel Corp. has notified pensioners that a 10 per cent reduction in effect during the depression has been terminated as of Dec. 1.

More Prospects In Farm Market

MEANS of improving farming practices and equipment were discussed at the winter meeting of the American Society of Agricultural Engineers at the Stevens hotel, Chicago, Nov. 20-Dec. 4.

Speaking before the farm structures division, Earl A. Anderson, Republic Steel Corp., pointed out that recent developments in improving the quality of metal sheets have overcome many limiting factors in connection with their use by agriculture.

Steel producers have lagged behind other industries, however, in promoting their products for agricultural use, he indicated. "Many of the industries supplying the building materials commonly used on the farm have been actively engaged in a research and educational program over a period of years, to help the farmer use their products to best advantage. The steel industry, however, apparently has considered the farm building market largely as a matter of course, and until recently has not been prominent in product development in this field.

"As a result of the ramification of industry in recent years, many new products in various sizes, shapes and chemical analyses have been developed by the steel industry for the industrial building market, and progress is being made in adapting these new products to farm structures.

"Recent new developments in the use of steel in farm buildings include the metal clad construction complete with metal trim, flashing, window sash, and doors for use in either dwelling or outbuilding construction. Prefabricated steel wall framing units together with steel floor and ceiling joists, which may be developed with the use of any of the common building materials, is a type of construction also new.

"With agriculture becoming an increasingly important market for steel, the educational interests may expect much closer co-operation from the steel industry in the future in helping the farmer solve his many building problems."

Machinery Affects Income

Developments in agricultural implements and tractors and their application to farm use were described at sessions of the power and machinery division. Results of a research project instituted in 1929 by the federal bureau of agricultural engineering to determine the engineering needs of typical farms were discussed in a paper by G. R. Boyd, assistant chief of the bureau. This investigation indicated that the income value of a farm is determined by the labor and machinery employed.

"These are the engineering elements of the farm business and it would appear that the importance of their effect has been underestimated," he said.

Structural Steel Erected At Rate of 208 Tons Daily

EIGHTY-FOUR hundred tons of steel were erected at the rate of 208.3 tons daily during the 43.2 working days required for the recent completion of this 36-story building in Rockefeller Center group, New York. This is a world's record for erection of skyscraper steel, say Post & McCord Inc., builders. American Bridge Co. fabricated the steel.

Census Shows Gain in Cast Pipe Employment

Employment and production in cast iron pipe and fittings plants showed increases in 1935 compared with 1933, according to the census of manufacturers reported last week.

The number of wage earners in 1935 was 13,543, a gain of 43.3 per cent. Wages rose 77.4 per cent. The value of manufactures in 1935 was $34,733,761, up 86.3 per cent.

Power Transmission Council Organizes

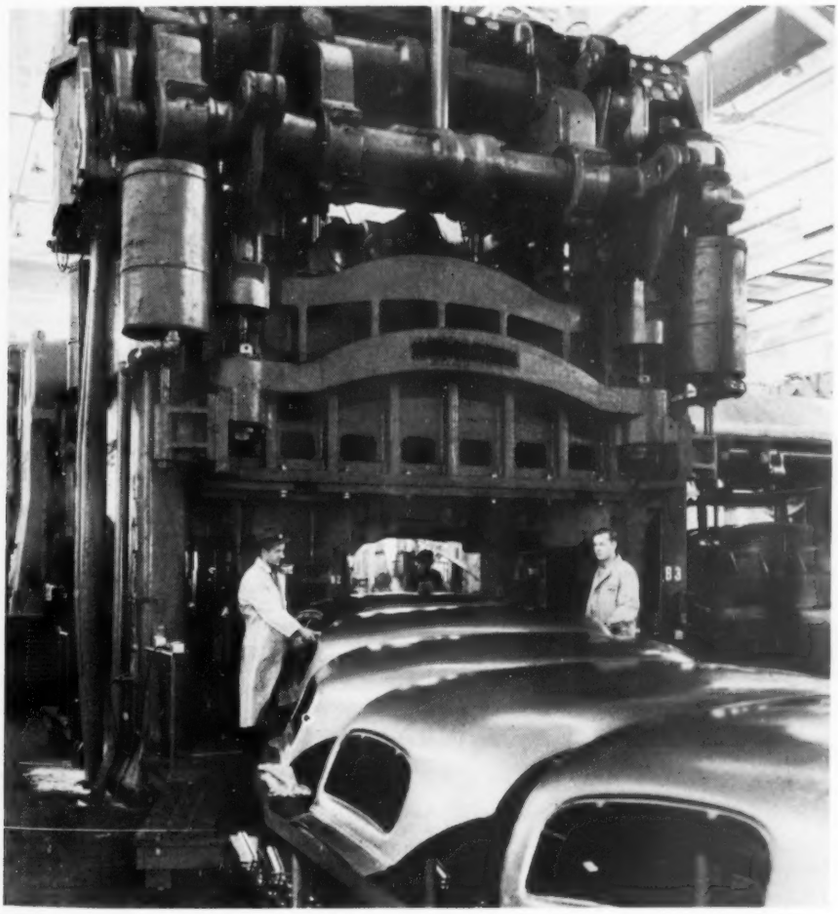
ENTHUSIASTIC over the accomplishments of their co-operative movement in the past five years, members of the Power Transmission council met in New York Dec. 3, and approved a plan for extending the work of research and education. The first step in this program was the incorporation of the organization.

A board of trustees was elected as follows: Chairman, Charles E. Brinley, American Pulley Co., Philadelphia; vice-chairman, Mark M. Jones; P. C. Brown, I. B. Williams & Sons, Dover, N. H.; W. H. Fisher, T. B. Wood Sons Co., Chambersburg, Pa.; W. W. French, Dodge Mfg. Co., Mishawaka, Ind.; B. A. Keiley, R. & J. Dick Co. Inc., Passaic, N. J.; A. P. Homer, president of council; A. F. Townsend, Manhattan Rubber Mfg. Div., Raybestos-Manhattan Inc., Passaic, N. J.; F. H. Willard, Graton & Knight Co., Worcester, Mass.; and R. M. Pindell Jr., Alexander Bros., Philadelphia.

The board named the following officers: President, A. P. Homer; vice-president and chief engineer, V. A. Hanson, Boston; treasurer, D. W. McAllen, SKF industries Inc., New York; secretary, Miss D. M. Rae, Boston. Headquarters will be maintained in Boston.

Approximately 75 manufacturers, distributors and others attended a general session under the council's auspices. The program, designed to turn the spotlight on the work of the council and the general importance of mechanical power transmission equipment, included the following subjects and speakers: "How P. T. C. Helps Customer Good Will," Frank Gaskill, Philadelphia Electric Co.; "Versatility in Power Transmission," D. S. Sammis, Underwood-Elliott-Fisher Co., Bridgeport, Conn.; "What the Council Has Done For Our Industry," H. E. Torrell Syracuse Supply Co., Syracuse, N. Y.

Steel Stamped Into Turret Tops with Clock-like Precision



DRAWN and formed under 5200 tons pressure, the solid steel turret tops for the new "unisteel" Fisher bodies issue in an unending stream from this battery of giant presses in the Grand Rapids, Mich. stamping plant of General Motors. Formal inspection of this new stamping division was made by General Motors and Fisher Body executives Dec. 2.

Steel Exports in Strong Upsurge

EXPORTS of manufactured and semimanufactured steel products in October totaled 139,535 gross tons, valued at $8,813,700. This is a high record for many months, according to the metals and minerals division of the department of commerce. This is an increase of 79 per cent in quantity over the total for September and of 59 per cent over October, 1935.

Including 125,397 tons of scrap total steel and iron exports for October were 264,932 tons, compared with 236,784 tons in September and 238,350 tons in October, 1935.

Striking increases in numerous items marked the October trade, the outstanding ones being registered in tin plate, 10,503 tons; skelp, 10,222 tons; "other plate," 8190 tons; fabricated structural shapes, 6289 tons; black steel sheets, 5933 tons; and heavy rails, 5054 tons.

A somewhat lower level of scrap shipments prevailed during October when the aggregate of 125,397 tons valued at $1,693,706 recorded respective declines of 20.2 per cent and 14.4 per cent under the September totals. When compared with the trade in October, 1935, although a decline of 16.4 per cent in volume was recorded there was a 3.3 per cent value increase. Scrap exports during the first 10 months of 1936 amounted to 1,755,979 tons valued at $21,750,850 and while the volume when compared with that reached in the corresponding period of last year declined 4.8 per cent there was a 9.1 per cent gain in the value.

Outlook Bright, Says Taylor; SWOC Reporters Present

Referring to the business outlook for the steel industry as bright, but unwilling to comment on rumors of an additional plant expansion in the Pittsburgh district, Myron C. Taylor, chairman, United States Steel Corp., visited Pittsburgh last Thursday. He, in company with other executives of the Steel corporation and Carnegie-Illinois Steel Corp., were there to attend the dinner which the Coal Research Laboratory tendered at the Carnegie Institute of Technology at which he was honorary guest. (see page 40.)

Among press representatives who interviewed him were two members of the Steel Workers Organizing committee, reporters for their paper. Mr. Taylor, however, refused to comment on the organization drive or on criticism of the cost-of-living scale for wage payments.

November Pig Iron Gains 2 Per Cent; 4 Stacks Resume

COKE pig iron production continued the upward swing of recent months by registering a small increase in November. At the same time, a net gain of four was made in active blast furnaces, raising the total on Nov. 30 to 165.

Average daily production in November was 98,331 gross tons, which, compared with the rate of 96,509 tons in October, was an improvement of 1822 tons, or 1.9 per cent. This was the highest rate reached since May, 1930, with 104,564 tons. The daily rate in November, 1935, was 68,876 tons.

Total production for November with 2,949,942 gross tons was 41,852 tons less that the 2,991,794 tons in October. This was a drop of 1.4 per cent and is accounted for by the fact that November was a one-day shorter month than October. Output in November, one year ago, was 2,066,293 tons.

For the 11 months ending in November, production has aggregated 27,557,512 tons, as compared with 18,924,987 tons for the corresponding period of 1935. The increase amounts to 8,632,525 tons, or 45.6 per cent. Only 14,949,673 tons was made in 11 months of 1934.

Relating production to capacity, operations in October were at 72.3 per cent, compared with 71.0 per cent in October and 49.5 per cent in November last year.

The total of 165 blast furnaces on Nov. 30 compared with 161 on Oct. 31 and was the highest level since May, 1930, with 180. Active stacks in November, 1935, totaled 122. During the month, seven nonmerchant or steelworks stacks resumed and three were blown out or banked. Of the merchant class, one was blown in and one blown out.

Furnaces resuming in November were: In Pennsylvania: Cambria H and Steelton B, Bethlehem Steel Co.; Midland No. 3, Pittsburgh Crucible Steel Co. In Alabama: One North Birmingham, Sloss-Sheffield Steel & Iron Co.; Ensley No. 6, Tennessee Coal, Iron & Railroad Co. In Illinois: South Works New No. 6, Carnegie-Illinois Steel Corp. In Indiana: Gary No. 3, Carnegie-Illinois Steel Corp. In Minnesota: Duluth, American Steel & Wire Co.

Stacks blowing out or banking were: In Ohio: One River, Republic Steel Corp. In Pennsylvania: Steelton A, Bethlehem Steel Co. In New York: Troy, Troy Furnace Corp. In Illinois: South Works New No. 5, Carnegie-Illinois Steel Corp.

MONTHLY IRON PRODUCTION
Gross Tons

	1936	1935	1934
Jan.	2,029,304	1,478,443	1,225,643
Feb.	1,838,932	1,614,905	1,270,792
March	2,046,121	1,770,990	1,625,588
April	2,409,474	1,671,556	1,736,217
May	2,659,643	1,735,577	2,057,471
June	2,596,528	1,558,463	1,936,897
July	2,595,791	1,520,340	1,228,544
Aug.	2,711,726	1,759,782	1,060,187
Sept.	2,728,257	1,770,259	899,075
Oct.	2,991,794	1,978,379	951,353
Nov.	2,949,942	2,066,293	957,906
Tot. 11 mo.	27,557,512	18,924,987	14,949,673
Dec.	.....	2,115,496	1,028,006
Total	.....	21,040,483	15,977,679

NOVEMBER IRON PRODUCTION

	No. in blast last day of Nov.	Oct.	Total tonnage Merchant	Nonmerchant
Ohio	36	37	90,320	608,505
Penna.	57	55	99,600*	851,360*
Alabama	15	13	99,745	93,981
Illinois	12	12	53,690	200,156
New York	13	14	84,818	144,712*
Colorado	1	1		
Indiana	14	13	10,991	443,167
Maryland	5	5		
Virginia	0	0		
Kentucky	2	2		
Mass.	1	1		
Tenn.	0	0		
Utah	1	1	23,797	145,100
West Va.	2	2		
Michigan	4	4		
Minnesota	2	1		
Missouri	0	0		
Total	165	161	462,961*	2,486,981*

*Includes ferro and spiegeleisen.

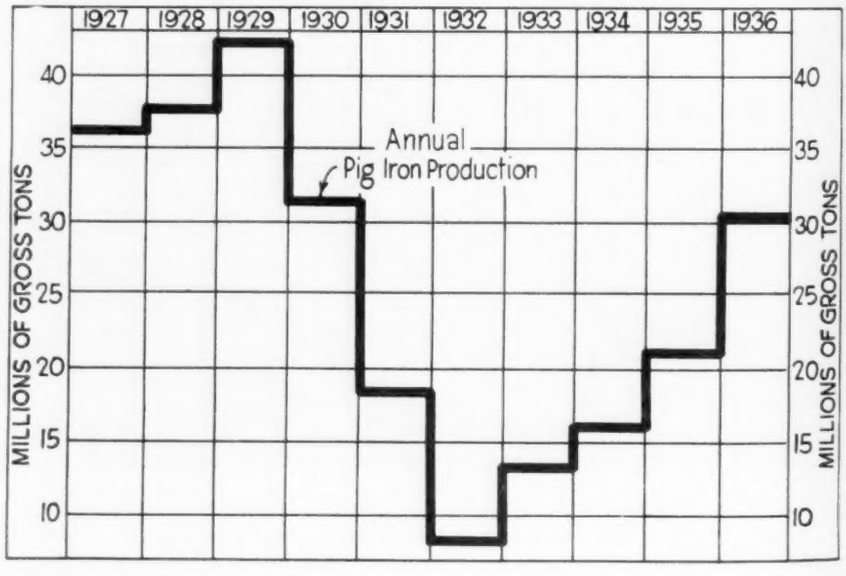
AVERAGE DAILY PRODUCTION
Gross Tons

	1936	1935	1934	1933
Jan.	65,461	47,692	39,537	18,348
Feb.	63,411	57,675	45,385	19,752
March	66,004	57,120	52,438	17,484
April	80,316	55,719	57,873	20,786
May	85,795	55,986	66,370	28,784
June	86,551	51,949	64,563	42,165
July	83,735	49,043	39,630	58,108
Aug.	87,475	56,767	34,199	59,137
Sept.	90,942	59,009	29,969	50,264
Oct.	96,509	63,818	30,689	43,824
Nov.	98,331	68,876	31,930	36,124
Dec.	.....	68,242	33,161	38,456
Ave.	82,261	57,694	43,774	36,223

RATE OF OPERATION
(Relation of Production to Capacity)

	1936[1]	1935[2]	1934[3]	1933[4]
Jan.	48.2	34.2	28.3	13.3
Feb.	46.6	41.4	32.5	14.3
March	48.5	41.0	37.5	12.7
April	59.1	40.0	41.4	15.1
May	63.1	40.2	47.5	20.9
June	63.6	37.2	46.3	30.6
July	61.5	35.2	28.4	42.4
Aug.	64.3	40.7	24.5	42.8
Sept.	66.9	42.5	21.5	36.4
Oct.	71.0	45.8	22.1	31.8
Nov.	72.3	49.5	22.8	26.2
Dec.	....	49.0	23.7	27.9

[1]Based on capacity of 49,777,893 gross tons, Dec. 31, 1935; [2]capacity of 50,845,741 gross tons, Dec. 31, 1934; [3]capacity of 50,975,561 tons, Dec. 31, 1933; [4]capacity of 50,313,975 tons, Dec. 31, 1932. Capacities by American Iron and Steel Institute.



Production of coke pig iron in the United States took a long step in recovery this year. Output in 1932 was 8,674,067 tons; the estimate for 1936 is 30,600,000 tons

Production

HEAVIER operating schedules in the Pittsburgh, Youngstown, Cleveland, and Wheeling districts increased the national steelworks rate 1 point last week to a new high for the year, 76½ per cent, compared with 57 and 30 per cent, respectively, in the like weeks of 1935 and 1934.

Youngstown—Gained 3 points to 78 per cent, as Republic Steel Corp. added two open hearths here and one at its Warren plant. Youngstown Sheet & Tube Co. resumed its bessemer last Tuesday, while Carnegie-Illinois Steel Corp. late in the week dropped one open hearth at its Ohio works for repairs. Sheet & Tube is expected to put on an additional furnace at Brier Hill. Tentative schedules indicate an average of about 80 per cent this week.

Cleveland-Lorain—Rebounded 2½ points to 79½ per cent, as Otis, Steel Co. put its eighth furnace in operation. National Tube Co., Lorain, O., and Republic Steel Corp., continued with unchanged schedules.

Chicago—Held at 77 per cent, and operations will continue at or above this figure for the balance of December, with an equally good outlook prevailing for January. One steelworks blast furnace and one merchant stack have been lighted, bringing the number of active units to 27 out of 38.

New England—Rose from 88 to 91 per cent, with indications that a higher rate will prevail this week.

Cincinnati—Unchanged at 96 per cent, with 23 open hearths active.

Detroit—Off 5 points to 95 per cent, as 20 out of 21 open-hearth furnaces were in production.

Wheeling—Up 3 points to 92 per cent, based on production in 34 out of 37 open-hearth furnaces, a gain of one active unit.

Pittsburgh—Up 2 points to 72 per cent, based on gains recorded by both the Corporation subsidiaries to 69 per cent and independents at about 78-79 per cent. Successive improvement by weeks is expected through the balance of December as mills work down one of the largest backlogs they have accumulated in recent years. Forty-four out of 60 steelworks blast furnaces are melting: Carnegie-Illinois has 18 of 32 on; National Tube, 3 of 4; American Steel & Wire, 1 of 2; Jones & Laughlin, all 11, Bethlehem Steel, all 7; Pittsburgh Crucible Steel and Pittsburgh Steel, each with two.

Buffalo—Held at 84 per cent for the fifth consecutive week, and no immediate change of major character is in sight.

Central eastern seaboard — Unchanged at 48½ per cent, with a higher rate expected before the holidays.

Birmingham — Remained at 74 per cent, with 16 furnaces active. This rate will likely be held over the remainder of the year.

St. Louis—Unchanged at 68 per cent for the fourth consecutive week.

District Steel Rates

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended Dec. 5	Change	Same week 1935	1934
Pittsburgh	72	+ 2	43	23
Chicago	77	None	63	34
Eastern Pa.	48½	None	39½	20½
Youngstown	78	+ 3	60	35
Wheeling	92	+ 3	78	70
Cleveland	79½	+ 2½	82	48
Buffalo	84	None	47	24
Birmingham	74	None	56	27½
New England	91	+ 3	93	47
Detroit	95	— 5	94	48
Cincinnati	96	None	†	†
St. Louis	68	None	†	†
Average	76½	+ 1	57	30

†Not reported.

Steel Industry's Employes Now 15 Per Cent Over 1929

Nearly 5000 employes were added to the payrolls of the steel industry during October, bringing current employment to 531,400, more than 15 per cent above the 1929 level, the American Iron and Steel institute reports. In October, 1935, the industry had 436,600 employes, indicating a 22 per cent increase.

Payrolls in October totaled $71,110,000, almost $1,000,000 above the average monthly payrolls in 1929, and nearly $20,000,000 more than was paid out in October last year.

By comparison, the average daily output of steel ingots during October, 168,333 tons per day, was lower than the 1929 average of 174,638 tons daily.

Of the 531,400 employes at work in the industry during October, 480,800 were wage earners paid on an hourly, piecework or tonnage basis.

Hourly earnings of wage earners during the month averaged 66.3 cents. It is expected that the increase which went into effect Nov. 16 will raise this to about 73 cents.

During October, wage earners worked an average of 42.5 hours per week, which compares with 40.5 hours in September. In 1929 they worked an average of 55 hours.

In conjunction with the Crucible Steel Co. of America, a Crucible Steel Co. of Canada, Ltd., Toronto, Ont., has been organized and has announced the appointment of Railway & Power Engineering Corp., Ltd., Toronto, as distributors of Crucible steels throughout the dominion.

Scrap Becomes Attractive "Show" Material

SCRAP was "dolled up" and put on a pedestal among the 100 exhibits at the recent Chicago Purchasing Agents association's show. The various grades were displayed to good effect. With more scrap than pig iron now being used in producing steel, and steelworks scrap selling at about $16 a ton, purveyors see "dramatic" possibilities in it

Men of Industry

HARRY H. HOLLOWAY, general superintendent of the Monroe, Mich., plant of Newton Steel Co., subsidiary of Republic Steel Corp., Cleveland, has been appointed assistant manager of the Cleveland district of Republic. Mr. Holloway began his career with the former American Sheet & Tin Plate Co. in 1909, and during the past 27 years has been associated with the LaBelle Iron Works, Steubenville, O.; DeForest Sheet & Tin Plate Co., Niles, O.; Brier Hill Steel Co., Youngstown, O., in charge of the company's sheet mill at Niles; Sharon Steel Hoop Co., in production and sales departments; and Apollo Steel Co., Apollo, Pa., as assistant to the president. He joined Newton in 1935.

Harry H. Holloway

Robert Ritze has been placed in charge of the Monroe, Mich., plant of Newton.

Other appointments made by Republic are as follows:

John W. Hughes has been transferred from the Warren, O., plant to Cleveland where he will take charge of Republic's new $15,000,000 strip mill. Mr. Hughes became associated with the Warren plant in 1913; in 1929 he was made superintendent of the hot strip finishing department, and during the past four years he has been superintendent of all the hot strip departments.

Raymond C. Gintert, assistant superintendent of the Warren hot strip department, has been appointed superintendent to succeed Mr. Hughes. Mr. Gintert spent three years teaching school before entering the engineering department of the Truscon Steel Co., Youngstown. From there he went to the Trumbull Steel Co. in 1917, spending a year in the sheet department. The balance of the 19 years with Trumbull, which later became a part of Republic, was spent in the hot strip department.

James J. Bowden, formerly assistant superintendent of sheet and tin department, Warren district, has been transferred to Cleveland where he will act as chief metallurgist. Following graduation from Ohio State university in 1914 as a mining engineer, he spent the next two years in Calcutta, India, for the Standard Oil Co. of New York. In 1917 he became identified with the Colonial Steel Co., Pittsburgh, as metallurgist; following air service during the World war he became metallurgist for the Laclede Steel Co. Later he joined the sales department of Wheeling Steel Corp., and after a short time left to resume his position with Laclede as chief metallurgist. In 1928 he joined American Rolling Mill Co., and in the same year joined Republic as chief metallurgist for the Warren district.

Bert Kennedy has been appointed assistant chief metallurgist.

B. R. Richardson, formerly superintendent, Enduro sheet and strip divisions of Republic, has been made superintendent of United Steel division, Canton, O. He became identified with the former American Sheet & Tin Plate Co. at Gary, Ind., in 1919 and since then has been associated with the Indiana Rolling Mill Co., Mansfield Sheet & Tin Plate Co., Central Steel Co. at Massillon, now a part of Republic, and the South division of United Alloy Steel Co. He was made superintendent of the Enduro sheet and strip divisions in 1935.

James G. Davey, superintendent, Canton Tin Plate Co., a Republic subsidiary, succeeds Mr. Richardson as superintendent of the Enduro sheet and strip divisions.

John T. Brown

Who, as noted in STEEL, Nov. 9, Page 30, has been elected a vice president, Chain Belt Co., Milwaukee. Mr. Brown became identified with Chain Belt in 1925, following graduation from Yale university

♦ ♦ ♦

John L. Young, service engineer in the sales department, United Engineering & Foundry Co., Pittsburgh has been appointed manager of machinery sales. Following graduation from the University of Indiana in 1921, he was associated with the Timken Roller Bearing Co. for 14 years, most of which time he specialized in the application of bearings for mine cars. During his association with Timken, he was Pittsburgh district manager, and for a year preceding his identification with United Engineering, he was assistant general manager of the industrial division at Canton, O.

Joseph Kinney, associated with the machinery sales department since 1931, United Engineering & Foundry Co., has been made assistant manager of machinery sales.

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Commodore A. O. Ackard, since February, 1919, general superintendent of the river transportation department, Carnegie Steel Co., and later for the combined Carnegie-Illinois Steel Corp., has retired, effective Dec. 1. His retirement, at the age of 70 is due to the company's compulsory rule.

Harry F. Shaw, now assistant general superintendent of the river transportation department, has been named to succeed Commodore Ackard. Mr. Shaw was identified with the National Tube Co., Mesta Machine Co., McKeesport Tin Plate Co., and the by-product coke works of Carnegie Steel Co. at Clairton, Pa. before his identification with Carnegie's marineways in 1930.

Commodore Ackard will be honored at a testimonial dinner in the Roosevelt hotel, Pittsburgh, Dec. 10.

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E. Trimborn has been elected president, Milwaukee Bridge Co., Milwaukee, to fill the vacancy caused by the death of Conrad Trimborn, who also was treasurer. Henry A. Trimborn, for many years a director, has been made treasurer. Conrad L. Trimborn continues as secretary, and Henry A. Merz as vice president.

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J. A. Long, former general manager, Woodward Iron Co., Birmingham, Ala., and since 1934 district sales manager at Birmingham for Macwhyte Co., maker of wire rope,

Move Up in Foundry Association, and Magazine Work

AS FIRST step in a program for broadening activities, the executive committee of the board of directors, American Foundrymen's association, in Chicago, Dec. 4, elected C. E. Hoyt, for the past 18 years executive secretary-treasurer, to the position of executive vice president. This was in accordance with the recent revision of the by-laws.

Dan M. Avey, formerly vice president and director of the Penton Publishing Co. and editor of *The Foundry*, was elected secretary-treasurer.

Mr. Hoyt will continue as the executive officer of the association. Mr. Avey's election will make available to the industry the services of one who, as editor of *The Foundry* and active participant for many years in association work, has an understanding of the problems and ramifications of the industry.

Coincident with Mr. Avey's resignation, the Penton company appointed Frank G. Steinebach editor of *The Foundry*.

C. E. Hoyt

Dan M. Avey

Frank G. Steinebach

Mr. Steinebach was born in Bourbon, Ind., Nov. 25, 1896. He was graduated from Purdue university in 1922 as bachelor of science in electrical engineering, and became editorial representative of *Iron Trade Review*, STEEL's predecessor, and a Penton publication.

In 1924 he was transferred to the editorial staff of *The Foundry* and in 1925 became associate editor of that publication. On Jan. 1, 1929, he was appointed managing editor.

Mr. Steinebach served as chairman of the international relations committee of the American Foundrymen's association, and is chairman of the Northeastern Ohio chapter of that organization.

Kenosha, Wis., has been appointed assistant general sales manager of the company.

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Hon. J. L. Ralston, Montreal, Que., and J. McGregor Steward, Halifax, N. S., have been elected directors of the Dominion Steel & Coal Corp. Ltd., Montreal, Que.

♦ ♦ ♦

James S. Ayling has been elected secretary, Case Hardening Service Co., manufacturer of case hardening compounds, Cleveland. He also has been elected to the board of directors, and will still continue his position as sales manager.

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P. G. Rau, formerly manager of sales, Terre Haute Boiler Works, Terre Haute, Ind., has been elected vice president in charge of sales, credits and collections, and also assistant to the president, Cliff Boiler Co., New York.

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A. W. Daniels, formerly vice president, American Manganese Steel Co., has been named president and manager, Universal Crusher Co., Cedar Rapids, Iowa, manufacturer of rock crushing machinery and other crushing equipment. He succeeds W. L. Harrison, manager of the company since 1912.

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W. G. Hume has been appointed manager of sales of wire products, Pittsburgh Steel Co., succeeding William Steytler, who has been transferred to the Philadelphia office of the company as district sales manager. C. L. Wade, formerly district manager at Philadelphia, has been transferred to Pittsburgh.

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B. C. Heacock, president, Caterpillar Tractor Co., Peoria, Ill., has been nominated for president, Illinois Manufacturers' association, subject to election Dec. 8.

J. C. Belden, president, Belden Mfg. Co., Chicago, has been nominated for first vice president, and J. E. Otis Jr., president, Stewart-Warner Corp., Chicago, has been named for second vice president.

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Edward Hill, formerly superintendent of open hearth No. 4, Homestead steelworks, Carnegie-Illinois Steel Corp., who resigned from that position about a month ago, has been appointed assistant superintendent of the open-hearth department of the Duquesne works of the company.

Robert L. Fatzinger, assistant superintendent of the Duquesne open-hearth department, has become superintendent of open hearth No. 4 at the Homestead plant.

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Mace H. Bell has joined the staff of the American Institute of Steel Construction, New York, and has been appointed district engineer for the southwestern territory with headquarters in New Orleans. He formerly was assistant engineer with the United States engineers office, Zanesville, O.

Robert J. Wood has resigned from the institute staff to take a position with the Mississippi Valley Structural Steel Co., and L. H. Dodd has moved from Dallas, Tex., to take over the St. Louis office left vacant by Mr. Wood.

Died:

PROF. FRANK P. MCKIBBEN, 65, bridge engineer and past president, American Welding society, at his home near Fayetteville, Pa., Nov. 27. Born at Fort Smith, Ark., Professor McKibben devoted his career to engineering instruction, writing and consulting work. He taught engineering at Massachusetts Institute of Technology, Lehigh university and Union college for more than 22 years. He formerly was consulting engineer, for General Electric Co.

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M. M. Cochran, 82, independent coal and coke operator in Fayette county, Pennsylvania, in Uniontown, Pa., Nov. 27.

♦ ♦ ♦

Alexander Slaysman Jr., owner of Slaysman Machinery Co., and inventor of an automatic machine for

making tin cans, in Baltimore, Nov. 25.

♦ ♦ ♦

Leopold Wolf, member of Hilb & Bauer, iron and steel broker, in Cincinnati, Nov. 27.

♦ ♦ ♦

Albert W. Strong, 64, president, Strong-Scott Mfg. Co., Minneapolis, manufacturer of grain elevator and flour mill machinery, in that city, Nov. 25.

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David S. Brookman, 85, for 30 years general superintendent, Wellsville, O., plant of the former American Sheet & Tin Plate Co., in East Liverpool, O., Nov. 23. He retired about 20 years ago.

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William L. McDaniel, 73, manager of the order department, Union Switch & Signal Co., Swissvale, Pa., and continuously employed by that company for the past 50 years, in Pittsburgh, Nov. 28.

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William O. Chapman, head of W. O. Chapman Wire Works, Brooklyn, N. Y., in Bayonne, N. J., Nov. 24.

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Frank Maujean, for a number of years connected with the Monarch Engineering & Mfg. Co., Curtis Bay, Baltimore, and well known in the foundry field, at his home in Newport, Ky., Nov. 24.

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Samuel M. Lynch, 70, until his retirement in 1929 purchasing agent and assistant to the vice president, National Tube Co., Pittsburgh, in McKeesport, Pa., Nov. 28. He was born at Elizabeth, Pa., in 1866 and began a 47-year identification with National Tube in 1882.

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W. N. Rumely, 78, formerly head of M. Rumely Co., La Porte, Ind., and of machinery manufacturing enterprises in Sycamore, Ill., Hamilton, O., and Chicago, at his home in the latter city, Nov. 24.

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Alfred F. Cooke, 65, well known as a pioneer in the gear manufacturing industry, one-time president of William Fawcus Machine Co., Pittsburgh, and president of the Gear Manufacturers' association in 1928-29, in Pittsburgh, Nov. 27. He had been president of the Schaffer Poidometer Co. and at the time of his death was president of the Pittsburgh chapter, National Metal Trades association.

Ore Movement Largest in 6 Years; Cold Ends Brisk Season

THE sustained high rate of steel production and the increasing tempo of general industrial activity are reflected in the substantial movement of iron ore, bituminous coal and limestone on the Great Lakes in the season now closing.

With steel ingot output averaging 73 per cent and pig iron production 65 per cent of capacity, and steelmaking scrap ranging in price from $13 to $16 a ton over the past six months, the demand for iron ore has been steady throughout the season of navigation. Because of unusually severe weather and freezing temperatures in the latter half of October and during November, this demand, toward the end of the season, could not be fully satisfied.

Despite these unfavorable conditions iron ore shipments in American lake vessels this season totaled 44,822,023 long tons. During October iron ore shipments amounted to 7,301,284 long tons compared with 7,481,071 tons in September, and 4,600,661 tons in October, 1935. The total iron ore movement during the present season of navigation up to Nov. 1 was 41,063,872 long tons, compared with 26,804,874 long tons in the same period in 1935.

Because of extreme weather conditions the ore movement after Nov. 1 was disappointingly small—3,758,151 tons. However the total for the season, 44,822,023 long tons, is by far the largest amount of iron ore brought down in any year since 1930 when 46,582,982 long tons were moved.

With a total of about 42,250,000 tons up to 7 a.m., Nov. 23, the bituminous coal cargo movement by vessel from Lake Erie ports to the upper lakes during the present season is an all-time high record, exceeding the full season tonnage for any previous year in the history of the lakes. Bad weather has caused less delay in the movement of coal than ore, and it is conservatively estimated that the movement for the season will reach 43,500,000 short tons, which is about 5,500,000 tons more than the previous high record established in the year 1929.

WITH below-zero temperatures in the Lake Superior iron ore regions, vessel transportation has closed for the year. Shipments of ore, which amount to 44,822,000 tons, would have been at least 500,000 tons larger had weather conditions not interfered. A few of the smaller consumers already fear a shortage of ore before spring. Scrap dealers see a continuation of a strong market. The accompanying article detailing the shipments of ore, coal and limestone has been written for STEEL *by A. H. Jansson, long identified with transportation news on the Great Lakes.*

Reasons for this unprecedented coal movement are said to be the almost depleted supplies on hand at the beginning of the season due to the severe winter of 1935-36, and also the constantly increasing industrial activity in the territory served by the receiving ports.

Though figures are not compiled covering the monthly shipments of limestone, all indications point to a substantial increase over last year. Since one of its large uses is as a raw material in steelmaking, the limestone tonnage should compare favorably with the nearly 12,500,000 short tons shipped in 1930. This would represent an increase of about 3,500,000 tons over 1935.

However, the movement of limestone may well turn out to be considerably more than the estimated amount, because of increasing use of this material in the chemical industries, building construction, roads and for other purposes, in addition to steelmaking. The greatest movement of limestone in lake vessels in any one season was 16,269,612 short tons, 1929.

Lake Shipments of Iron Ore, Coal, Limestone

	Iron Ore (Long tons—2240 lbs.)	Bituminous Coal (Short tons—2000 lbs.)	Limestone (Short tons—2000 lbs.)
1936	44,822,023	43,500,000*	12,500,000*
1935	28,362,368	34,730,099	9,082,155
1934	22,249,600	34,869,536	7,392,218
1933	21,623,898	31,351,353	6,664,629
1932	3,567,985	24,563,391	3,928,840
1931	23,467,786	30,415,291	7,208,946
1930	46,582,982	36,839,923	12,432,628
1929	65,204,600	37,933,249	16,269,612

*Estimate for coal is based on actual total up to Nov. 23. That for limestone is based on a reasonable ratio to iron ore, and is likely to be low rather than high.

Porcelain Enameling Industry Expands Trade Promotion Program

WITH a schedule of more than 20 definite projects outlined for 1937, the Porcelain Enamel institute, Chicago, is completing plans for launching the greatest program in the industry's history immediately after the first of the year.

Prominent among the projects are the first annual enamelers' round table conference, porcelain enamel week, development of an all-porcelain enamel kitchen, revision of the industry's statistics as submitted to the department of commerce, trade show demonstrations and exhibits, publication of handbook on cast iron enameling, retail sales training course, revision of terms handbook, establishment of an industry barometer and an intensive drive for new members.

These are in addition to the general activities in which the institute and the various sections have been engaged, such as publicity, market and technical research, advertising and sales promotion, industry, trade and consumer contact and the activities of the recently formed production control section. The institute also plans to expand its sales promotion activities made possible by an increased budget.

More emphasis on trade shows and exhibits, and contacts with manufacturers of porcelain enameled products will be a feature of the industry, trade and consumer contact section's work. Work of the market research section already has been expanded and a more intensive program of market research is planned.

Activities of the technical research section also will be increased. Preliminary work on a cast iron handbook for the porcelain enameling industry has been completed.

The production control section is now making an industry-wide survey to determine what problems coming under its jurisdiction should have precedence.

The first round table conference will be held next May at the University of Illinois.

Preliminary plans developed by F. E. Hodek Jr., General Porcelain Enameling & Mfg. Co., institute vice president in charge of the new project, and his committee, indicate the conference will be a three-day affair. Enamelers' forums and short courses formerly conducted by Ohio State university, the University of Illinois and the Ferro Enamel Corp., are to be discontinued in favor of the institute conference.

In addition to the general sessions, which will be all-industry round table discussions, the outline for a tentative program shows the conference will be divided into sectional groups which will discuss problems pertaining to the enameling of cast iron, sheet metal and hollow-ware. The program will include an ABC enameling discussion, under the chairmanship of Prof. R. M. King, Ohio State university. Dr. A. I. Andrews, of University of Illinois, will lead the discussion. Details will be presented later.

Weekly Working Hours Below NRA Minimum

Average hours worked per week in manufacturing industry have increased slightly since the end of NRA but are still below the average of 40 hours a week set as a minimum for most industries by NRA in its effort to spread employment, according to the National Industrial Conference board, New York.

During the NRA period the work week averaged 35.6 hours. Following the declaration of the act as unconstitutional, there was a sharp increase due chiefly to lengthening the work week for workers who had been on part time. As a consequence, average hours worked per week increased to 37 for the period from June to December, 1935. The increase in the current year has been slight. For the first nine months of 1936 the work week averaged 38.6 hours.

Employment has increased since the end of NRA and now stands at 86.5 per cent of the 1929 level as against an average of 75.1 per cent of the 1929 level during the NRA period.

Because of the increase in hourly earnings and the lengthening of the work week, weekly earnings are now 15 per cent higher than the average for the NRA period.

Orders Plates Special Size For Delivery by Airplane

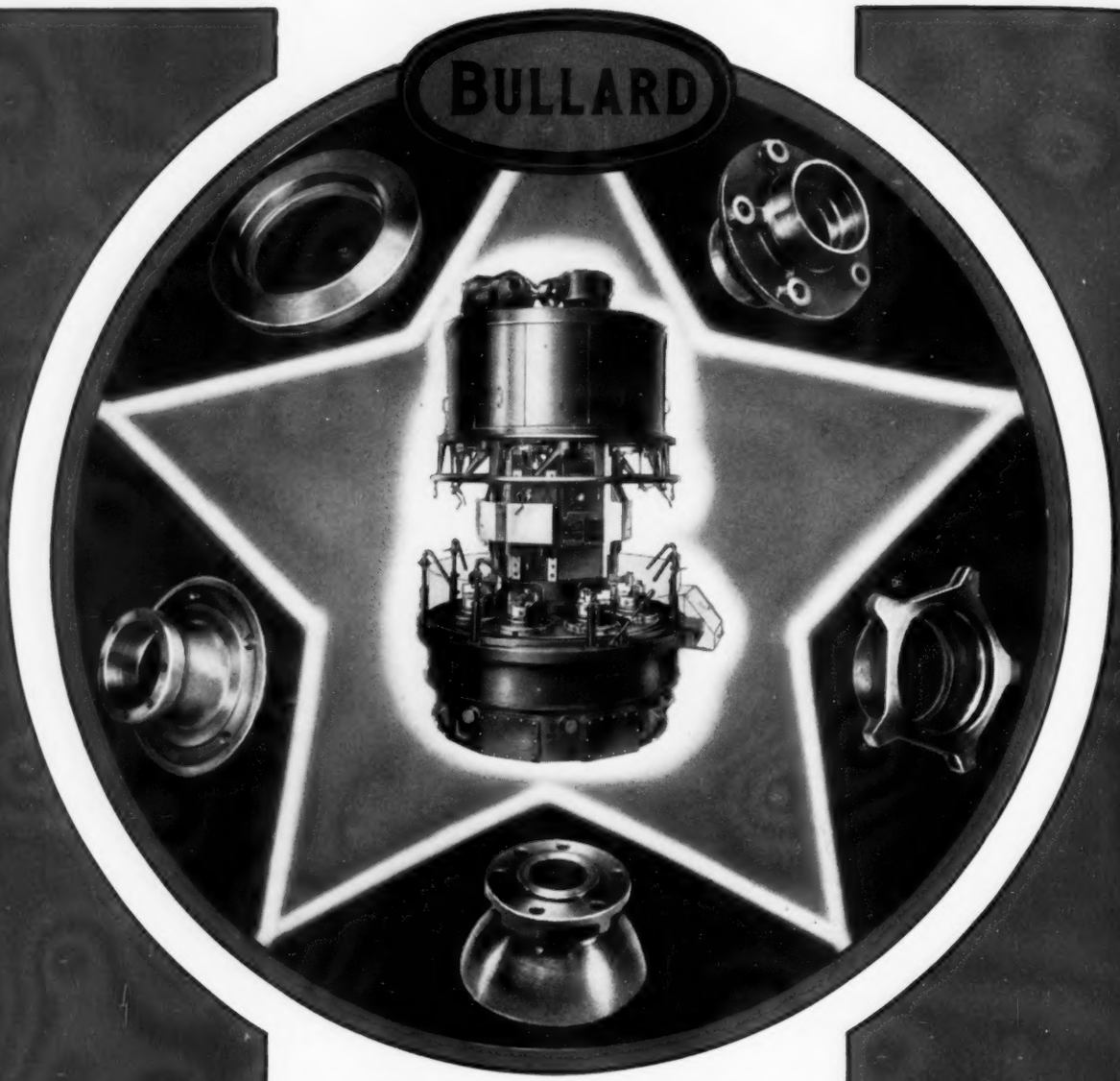
The use of airplanes for hauling heavy materials to outposts far from civilization has been increasing recently, one of the latest orders being received by Armco International Corp., a subsidiary of the American Rolling Mill Co., Middletown, O.

Engineers building a penstock in British Honduras ordered plates of such a size as to permit their passage through an airplane hatch measuring 3 x 5½ feet. The purchase was made by American Smelting & Refining Co., for its subsidiary, New York & Honduras Rosario Mining Co.

Airplane transportation provides the only suitable means for delivery of the plates.

Welding Helps Solve Church-Going Problem

IN THE delta of the Parana river in the Argentine, church attendance has been a problem. Now the place of worship, with its steeple, stained glass windows, its padre and alter goes to the congregation. The hull is that of an old vessel, 108 feet long. Steel and the electric arc welding process were used in transforming it into the floating church. Photo courtesy Lincoln Electric Co.



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MIRRORS of MOTORDOM

DETROIT

LABOR troubles again have shown some of the vulnerable points in the automobile industry.

General Motors, as these columns have related recently, found the experience of strike delays so trying in early 1934 that it has since spread its manufacturing to many places for the protection that diversity offers.

Ford, with more integration within its walls at Dearborn purposely built up over 33 years of its existence, comes closest to continence; and therefore has a closer contact with what is transpiring in its laboring ranks.

But all the manufacturers of automobiles, even Ford, are obliged to call on outside suppliers for some parts. Overhead costs, unit costs, convenience and other factors have helped result in this policy, even though it often makes labor an impersonal and abstract factor.

Of the "big three," Chrysler Corp.'s Plymouth, Dodge, DeSoto and Chrysler plants depend the most on factories other than their own for a wide range of parts. For example, frames from Midland, bodies from Briggs, wheels from Budd and even some motor blocks from outside foundries, supplement what the Chrysler plants make.

Frame Supply Exhausted

The Bendix strike at South Bend, Ind., two weeks ago hit all around Chrysler, but last week when unionists pulled a "sit-down" strike at Midland Steel Products Co.'s plant in Detroit, the shot hit home.

Four days after the strike started, frame inventories at many of the Chrysler Corp. assembly lines were exhausted. By Tuesday of last week Plymouth assemblies were contracting and since Plymouth is the volume, or "bread-and-butter," unit at Chrysler, the shutdown there was the most serious.

The secondary reaction hit manufacturers like Briggs, which makes Plymouth and Dodge bodies, where a corresponding drop in schedules had to go in. Down through the ranks of other suppliers the kick-back was similar.

The strike at Midland Steel Products Co., which is a subsidiary of Otis Steel Co., Cleveland, came in the midst of a wage negotiation. Through Gordon Stoner, vice president of Midland, a 10 per cent wage increase was offered, but since welders in the plant had received a similar increase not long ago, they were to be excepted.

The union, through J. W. Mortimer, vice president of the United Automobile Workers of America, said it wanted to raise welders' wages to $1 an hour, but 85 cents was the limit the Midland management offered.

Wages Asked and Offered

Other demands, with their corresponding counter-offers from management were: For assemblers, 75 cents asked and 72½ cents offered; for machine shop workers, 80 and 68 cents, respectively; and for woman employes, 60 and 58½ cents.

As the Midland strike lost time which Chrysler needed to work down its huge unfilled orders for cars, a similar skirmish on another front, plate glass, was at hand.

Pittsburgh Plate Glass Co., ordinarily a heavy supplier to Chrysler, has been shut down since Oct. 26, so Chrysler proceeded last week to reaward its business to Libby-Owens-Ford, which agreed to supply 5,000,000 square feet of safety glass over the next 30 weeks at its Ottawa, Ill., plant, once owned by General Motors.

But ink on the order was barely dry when workers at the Ottawa plant called a sympathy strike. Union leaders claimed that workers on Nov. 8 had voted a walkout if they were called on to manufacture safety glass for any customer of Pittsburgh Plate Glass Co.

All this means losses, both tangible and intangible, to the motor industry. First, down-time means high overhead costs. Second, the inability to supply dealers and the retail trade with new cars often results quickly in lost sales.

Chrysler has been proportionately the largest donor of bonuses to wage earners this year.

Beginning with a $2,300,000 bonus last St. Valentine's day, a $2,000,000 bonus on Aug. 10 and a $4,000,000 gift for its workers on Dec. 25, Chrysler will pay out $8,300,000 in bonuses this year.

In one sense, these gifts, plus similar ones by General Motors, have gone far to quiet troublesome labor factions. On the other hand, the persistent work of union organizers and the prosperous condition of the automobile industry have been among the primary causes for strikes here.

Concerning parts supplies, most of Chrysler's expansion in recent years has been in tempo with larger volume, but not toward assuming the manufacture of more of its component parts. The Evansville, Ind., improvement and the new plant on the Pacific coast are fair points of proof, while the only exception to the statement seems to be the new plant DeSoto put in on the west end of Detroit this past summer.

DeSoto Produces Stampings

That plant, now in operation, is making hood stampings and a variety of small pressed steel parts. Set up as a plant chiefly to house an assembly line, it draws its frames, motor assemblies, wheels and other parts from outside sources. The new DeSoto plant has no foundry.

Unhappy memories have been held by many persons in the automobile industry on the subject of "companion cars" and in even as active a market as the present, some of their moves seem suspicious of an old ailment.

The public's buying habits were to blame partly for the demise of those models which resembled brother models but had different names.

In addition, from a production standpoint, exceedingly complicated problems arose for the motor makers having two different cars going through the same plant and even down the same assembly line.

The trend of the times, in those

Mirrors of Motordom

successive contractions during the first few years of the 30's, sounded a death knell to "companion cars." Concentration on fewer makes was the order of the day.

Buick dropped its Marquette in the late 20's, Olds stopped making its Viking, Pontiac dropped Oakland, and Studebaker buried its Rockne.

The ensuing few years saw the idea carried even a step farther, for example, through formation of "B-O-P" by General Motors, the grouping of Buick, Olds and Pontiac under one management.

B-O-P eventually dissolved itself with better times, and Buick, Olds and Pontiac are back again as separate entities. Yet each, steering clear of the "companion car" subject, has not only bypassed the subject but is making more models on the same line than ever before. Notice, though, that Buick's four series all have one overall name, just as do Packard's four different models, and so on.

Favor Model Integration

The companion car's day is over, but some of the moves made by motor makers during the last year or so show that they still think fondly of model integration. Packard blossomed out with its low-priced six; General Motors increased its model coverage. Ford ventured out with the Lincoln-Zephyr and the small 60-horsepower V-8.

But to Olds goes credit on ground where others feared to tread. Through separate styling for the Olds six and Olds eight, this manufacturer has done something exclusive this year.

Examine the similarity—inside and out—of Chevrolet's two series, of Buick's four, of Cadillac's four, of Packard's lines, of Hudson's or Ford's. The lines seem to show that one designing genius had a finger in all of the respective models of any of those particular makers.

For that matter, some observers of motordom's products say design details are not a product of the individual maker, but result from an inclusive trend of design which, whether by coincidence or not, most of the industry takes to.

Witness the so-called "lip" hood that the Ford V-8 brought out first in 1936, made simply by a draw to the hood sheet in the front down over the radiator. Since then, close resemblances have been put out by Studebaker, Buick, Pontiac and Olds, not to forget DeSoto and both the Chrysler Royal and the Imperial.

Last week found Ford well on the road to establishing assemblies of 100,000 units for December. Slightly better than 27,000 models were turned out by all of the assembly units. One of Ford's characteristic model changes in midseason is likely to be an extension of stainless steel band, at present on the hood only, clear around and back to the rear trunk. A semblance of greater length to the body is the result.

Chevrolet's 27,800 assemblies last week lent further confirmation of the close race for leadership in the 1937 market. Due to the shutdown caused by frame shortages, Plymouth's output was a poor third.

Full operations on Saturday accounted for a gain by Pontiac, which was up to 5600 jobs against 5000 two weeks ago. Olds has set up a 25,000-unit schedule for December and has begun to make more than 1000 jobs daily. At 5500 assemblies last week, Olds made considerable headway over the 4000 recorded two weeks ago.

Buick's activity climbed back to the 5000-unit-per-week level after slight interruptions week before last owing to the Bendix strike. Dodge's rate slumped from the 8100 jobs of the preceding week, owing to the Midland Steel Products trouble.

Other assembly rates for the week found Cadillac and LaSalle at 1300 models, Chrysler around 2200, DeSoto turning out 1900, Hudson close to 4000, Studebaker around 2000 and Nash-LaFayette with approximately 1200 models.

One of the uses for steel in 1937 cars is in the "flex" steering wheel, a conventional wheel with spokes made up of three sets of individual bands.

In most designs, the former solid spokes have been replaced by groups of four or five bands which are made of stainless drawn wire. In a majority of the models of General Motors and Ford there are three groups per wheel, while in the Chrysler design there are two straight groups and one semicircular band.

According to reliable estimates, around 4000 cars a day in the industry are coming out with the "flex" wheel, a one-to-five ratio with total output, and a remarkable showing since the wheel is deluxe equipment.

New Use for Stainless

Four thousand cars daily means about 60,000 individual bands, which amounts to roughly one ton of steel—not a large individual use, but certainly a numerous parts item.

The claims made for the "flex" wheel are chiefly on safety, for under tests the steering member will not break off so quickly as a rigid member. It also has greater play and consequently less resistance in case of impact with the driver.

Champion Spark Plug Co., Toledo, O., is building a $500,000 plant in England. . . . . A rumor here in Detroit has it that Nash, once the merger with Kelvinator is completed, may come to use part of the Hupp plant. . . . . Willys, which went into show time with only about 100 hand-made cars on hand, has a production schedule of 5000 lined up for December and has taken on about 2500 men. . . . . Most of the trouble Olds has been having machining its motor block has been cleared up. . . . . Mullins Mfg. Co. is installing a new double-action toggle press, 180-inch width, at its Salem, O., plant. . . . . General Motors is well along towards completion of its 11-story experimental laboratory adjoining the General Motors building in Detroit.

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1934	1935	1936
Jan.	155,666	289,728	364,004
Feb.	230,256	332,231	287,606
Mar.	338,434	425,913	420,971
Apr.	352,975	452,936	502,775
May	330,455	361,107	460,565
June	306,477	356,340	452,955
July	264,933	332,109	440,999
Aug.	234,811	237,400	271,291
Sept.	170,007	87,540	135,130
Oct.	131,991	272,043	224,628
Nov.	83,482	395,059	.....
11 mo.	2,647,996	3,419,390	3,980,624
Dec.	153,624	404,528	*419,700
Year	2,753,111	3,946,934	.....

*Estimated.

Estimated by *Cram's Reports*

Week ended:

Nov. 14	104,248
Nov. 21	110,160
Nov. 28	104,283
Dec. 5	100,395

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by dust storms and cloudbursts

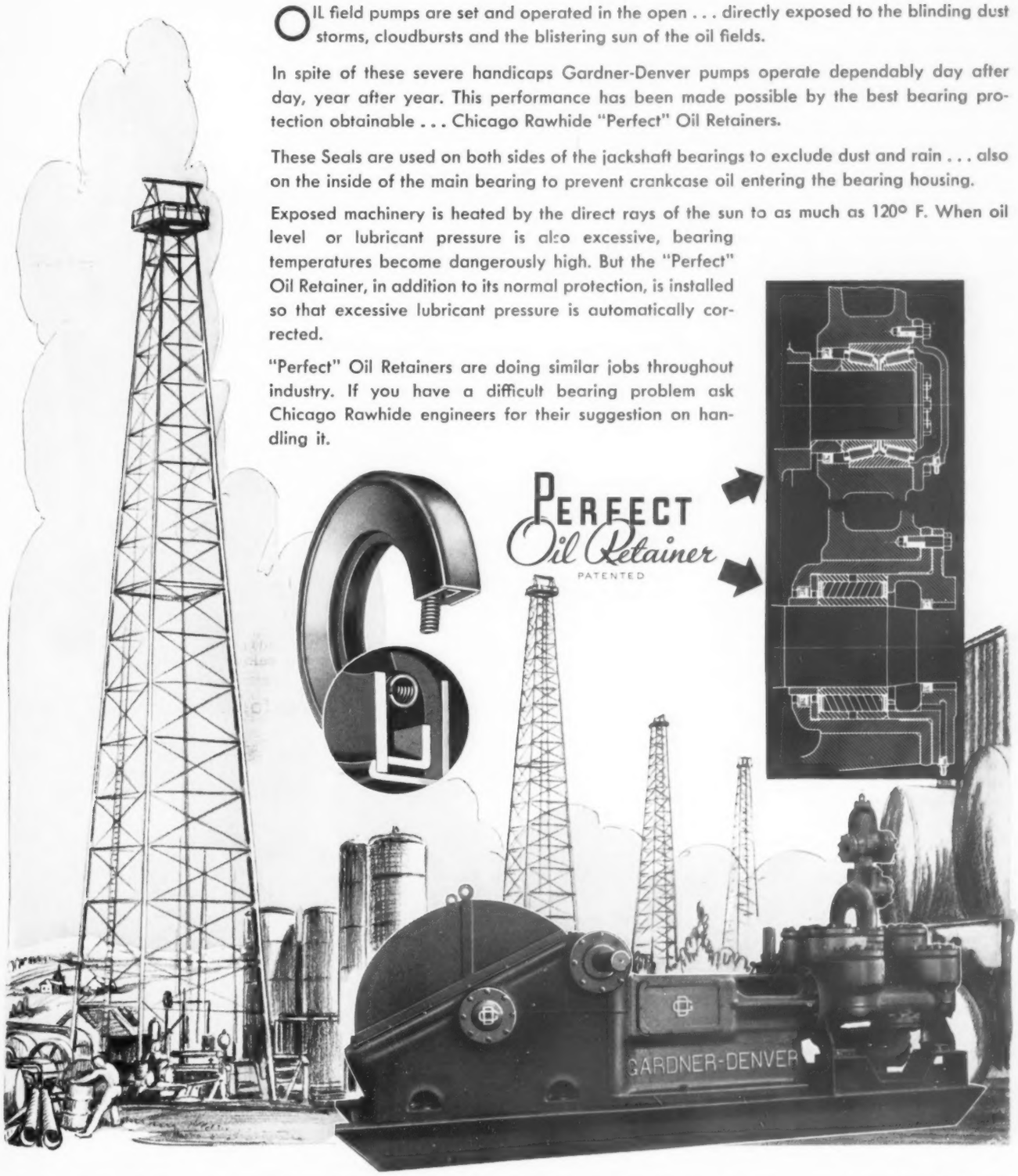
OIL field pumps are set and operated in the open . . . directly exposed to the blinding dust storms, cloudbursts and the blistering sun of the oil fields.

In spite of these severe handicaps Gardner-Denver pumps operate dependably day after day, year after year. This performance has been made possible by the best bearing protection obtainable . . . Chicago Rawhide "Perfect" Oil Retainers.

These Seals are used on both sides of the jackshaft bearings to exclude dust and rain . . . also on the inside of the main bearing to prevent crankcase oil entering the bearing housing.

Exposed machinery is heated by the direct rays of the sun to as much as 120° F. When oil level or lubricant pressure is also excessive, bearing temperatures become dangerously high. But the "Perfect" Oil Retainer, in addition to its normal protection, is installed so that excessive lubricant pressure is automatically corrected.

"Perfect" Oil Retainers are doing similar jobs throughout industry. If you have a difficult bearing problem ask Chicago Rawhide engineers for their suggestion on handling it.



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Meetings

E. T. WEIR TO ADDRESS CONGRESS OF INDUSTRY

A DECLARATION of "Principles of American Industry" will be made by the Congress of American Industry which occurs in conjunction with the annual convention of the National Association of Manufacturers, New York, Dec. 9-10, following a two-day meeting of the National Industrial council.

Among the subjects upon which it will define its policies are: agricultural co-operation, employment relations, government competition, government finance, government relation to industry, social security, tariff and industrial employment. The report of the committee on government finance will contain numerous recommendations to be placed before the joint congressional committee studying this subject.

At the main dinner Wednesday, Dec. 9, the principal addresses will be delivered by E. T. Weir, chairman, National Steel Corp. and chairman of the N.A.M. industrial information committee, on "Industry Must Speak Constructively." Lewis H. Brown, president, Johns-Manville Corp. and chairman of the N.A.M. committee on agricultural co-operation will speak on "New Horizons for America."

Other speakers and their subjects are: "Government Finances," J. R. McCarl, former comptroller general; "Avenues of Industrial-Government Co-operation," George H. Mead, chairman, Business Advisory council; "The Recovery Problem Today," Dr. Harold G. Moulton, president, Brookings Institution; "The Partnership of Industry and Science," E. R. Weidlein, director, Mellon Institute of Industrial Research; "Depression Causes and Cures," Willford I. King, professor of Economics, New York University.

70 PAPERS FOR CONGRESS ON TESTING MATERIALS

Many papers are scheduled for presentation at the International Congress for Testing Materials to be held in London next April under sponsorship of the International Society for Testing Materials. Group A, which covers metals, comprises some seventy papers, of which England contributes sixteen; Germany fourteen; United States and Sweden six each; France, Poland and Japan five each; and Austria and Belgium three each. Papers also will be contributed from Italy, Switzerland, Czechoslovakia and Uruguay.

Subjects include behavior of metals as dependent upon temperature, progress of metallography, light metals and their alloys, wear and machinability.

K. Headlam-Morley, 28 Victoria street, London, S. W. 1, is honorary secretary.

CARNEGIE INSTITUTE HOLDS ANNUAL COAL CONFERENCE

Marking the sixth anniversary of the coal research laboratory, technical experts of the coal and railroad industries met in a one-day session, Dec. 3, at Carnegie Institute of Technology, Pittsburgh. The meeting, sponsored by the laboratory, included reports by staff members, interpreting work done by the organization and its meaning to industry.

Dr. Thomas S. Baker, president emeritus of Carnegie institute and founder of the laboratory, gave a dinner in honor of Myron C. Taylor, chairman, United States Steel Corp. and one of the original sponsors of the laboratory. The dinner was attended by representatives of the Buhl Foundation, the largest contributor to the laboratory, and also companies supporting the laboratory, coal company executives and officials of coal-carrying railroads.

AUTO MAINTENANCE SHOW IN CHICAGO, DEC. 9-13

Automotive service industries show will be held on Navy pier, Chicago, Dec. 9 to 13 under auspices of the National Standard Parts association, the Motor and Equipment Wholesalers association and the Motor and Equipment Manufacturers association.

Reservations of space by exhibitors have been unusually extensive.

Convention Calendar

Dec. 7-8—National Association of Manufacturers. Meeting of National Industrial council in New York. Noel Sargent, 11 West Forty-second street, New York, is secretary.

Dec. 9-13—Automotive Service Industries show. Sponsored by National Standards Parts association, Motor and Equipment Wholesalers association and Motor and Equipment Manufacturers association. To be held at Navy Pier, Chicago. A. B. Coffman, Merchandise Mart, Chicago, is show manager.

Dec. 9-10—National Association of Manufacturers. Annual meeting at Waldorf Astoria hotel, New York. Noel Sargent, 11 West Forty-second street, New York, is secretary.

Dec. 10—Grinding Wheel Manufacturers' association. Quarterly meeting at Green Hill Farms, Philadelphia. Harry B. Lindsay, 27 Elm street, Worcester, Mass., is secretary.

Dec. 15-17—National Warm Air Heating and Air Conditioning association. Semi-annual meeting at Stevens hotel, Chicago. Allen W. Williams, 50 West Broad street, Columbus, O., is secretary.

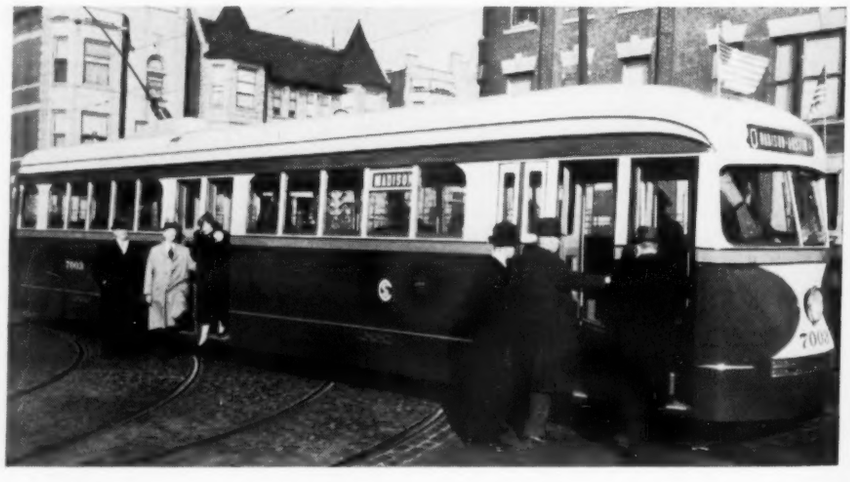
Jan. 7-11—American Engineering council. Annual meeting in Washington. F. M. Feiker, 744 Jackson Place N. W., Washington, is secretary.

Jan. 11-15—Society of Automotive Engineers. Annual meeting at Book-Cadillac hotel, Detroit. John A. C. Warner, 29 West Thirty-ninth street, New York, is general manager.

Jan. 12—Mining and Metallurgical Society of America. Annual meeting in New York. Percy E. Barbour, 90 Broad street, New York, is secretary.

Jan. 14-16—Institute of Scrap Iron and Steel. Ninth annual convention at Netherland Plaza hotel, Cincinnati. Benjamin Schwartz, 11 West Forty-second street, New York, is director general.

Light-weight Steel Contributes to Urban Transit



INDICATIVE of the great advances made recently in urban passenger transportation equipment, including street cars, and trolley coaches, are the new cars being installed on one of the heaviest traffic lines of the Chicago street railway system. Light-weight steel helps reduce the total weight to 34,000 pounds per car, a saving of 10,000 to 20,000 pounds compared with other Chicago cars. Rubber rings inside the steel wheel tires absorb noise and shocks. The 83 new units were built by the St. Louis Car Co., St. Louis. Photo courtesy General Electric Co.

WINDOWS of WASHINGTON

WASHINGTON

STATEMENTS have been made that Major George L. Berry is not smart. Here is a "believe it or not" and then you can judge for yourself.

Everyone in the industrial world probably knows by now just how much the department of commerce and its business advisory council "likes" Major Berry. Probably the cordial dislike between the two organizations is mutual.

Last week, Major Berry wrote a letter to Secretary of Commerce Roper, asking him to make an address at the opening of the Berry industrial council Dec. 10. This, of course, just put the secretary on the spot and in no uncertain manner. Backstair gossip at the commerce department is that it took the secretary completely off his feet. However it must be obvious that he had a previous engagement and therefore had to decline to accept "the kind invitation."

This shows just how smart the major is. And this, too, after having called the industrial conference without consulting the White House first, thus stealing a march on the President.

Roper Dodges on Berry

The obvious break between Secretary Roper's business advisory council and the Berry council came out in the open last week when Mr. Roper was questioned in considerable detail by newsmen at a press conference.

Asked if the council would participate in the Berry conference Mr. Roper said: "I do not control the business council outside of this department, and not much here. It acts in an advisory capacity here. If they want to do the same to some other group it is all right with me." Asked if both groups were working toward the same objective, the secretary said: "You understand—I want to be clear with you—I know our objective here, but I am not trying to run other groups. At the end we will all get to the same market. There are several roads." Questioned as to whether he thought that his group would get there first Mr. Roper said "all roads lead to Rome."

Dealing still with this same situation and showing considerable heat Mr. Roper said that "we are all interested in the objective, which is a co-operative endeavor of all units of our society, economic and social, coming together with an understanding, to stabilize our society and safeguard our future. Now, far be it from me to impeach the motives of anybody. I am not primarily concerned with anything except the objectives. Let us get together. Some will come in early and some will come in late. I believe, however, that we are studying at this time as we never studied before, these fundamental problems and these fundamental objectives which the President has announced, and I think as the new year gets under way you will see a clearer knowledge being revealed and I believe that business men will sense that and will come in and co-operate to that end. Now, that does not mean every business man, as we know, but the prevailing sentiment is that the majority will do so, and head into a new era and future."

All arrangements have now been completed for the Berry conference to be held here Dec. 10 and 11.

COLLUSIVE BIDDING PROOF SEEMS IN DIFFICULTY

While neither Attorney General Cummings or Assistant Attorney General Dickinson, in charge of anti-trust work for the department of justice, will discuss the matter for publication, it is known here that all is not rosy with the department's investigation of the alleged collusive steel bidding on government contracts. It will be recalled that President Roosevelt asked that this investigation be made following the receipt by him of a long report on the subject previously made by the federal trade commission.

The story going the rounds here is to the effect that the department has not uncovered enough evidence to give its officials confidence that they have a case against any of the steel firms involved. As a result it is said that much of the information is now being rechecked to see that there are no loose ends that might add strength to a case.

This investigation has been under way for some months by the department and at first only a few men were put on the job. Later, however, Attorney General Dickinson saw that it was to be a much harder job than he had at first expected, and additional men were put to work.

Report was made in these columns last week of a statement made by Mr. Cummings that the investigation was proceeding but that it had not reached the point where it could go to a grand jury. This, of course, was the usual window dressing answer given by a cabinet officer at a regular press conference.

It is said on good authority, however, that Mr. Dickinson has several times recently been in conference with Mr. Cummings on this matter, with the result that the work is being rechecked.

WALSH-HEALEY LAW PUTS DAMPER ON STEEL BIDS

Uncertainty exists in connection with application of the Walsh-Healey government contract law and bidding by steel firms on government business.

Reports are to the effect that several regular steel bidders on government supplies are taking different stands on the law. One of the larger firms, for instance, has adopted a policy now whereby it does not bid on any items over $10,000, therefore not coming under the Walsh-Healey act. This applies to bidding either directly or through an agent.

Another large steel company has not changed its policy regarding government business. This company is bidding just as it always did. Still a third large company does a little of both. That is, it does accept busi-

ness over $10,000 if the material is manufactured in certain of its plants.

Bids received by the government not only on steel but on many other commodities are much fewer since the Walsh-Healey law has been put into effect. In one case recently where there are generally some 35 steel bids, only two were received.

When paper bids were opened recently for the government printing office for a large quantity of paper for six months use, only 34 bids were received compared with 54 at the preceding opening six months ago before the law became effective.

CONSULAR TRADE REPORTS CAUSE DEPARTMENT DISPUTE

Repercussions of the recent foreign trade council meeting in Chicago are being heard at the department of commerce in connection with suggestions made by officials of the council that the foreign trade situation should be put back in the commerce department, insofar as it has been handed over to the state department.

There has been a dispute between these departments during the whole of this administration relative to obtaining commercial information abroad for the use of American industry.

For years this was efficiently handled by the department of commerce, having been built up to its maximum under the tutelage of Mr. Hoover when he headed the department. Much jealousy always existed between these two foreign service departments but Mr. Hoover had such a strong hold on the situation that the state department was not able to get away with anything.

When the Roosevelt administration came into the picture everything possible was done to the commerce department to take away its functions. One of these was obtaining the foreign trade information by American consular officers under the state department. This had always been the function of the foreign officials of the commerce department.

It is reported that there has been much dissatisfaction in business circles over this situation for a long time but there has been no outward movement to make any change until the situation came to the front at the recent Chicago meeting.

SOCIAL SECURITY BOARD SWAMPED AT START

Of course the social security board is not at fault but it has found that it has bitten off a pretty big chunk of work to register some 26,000,000 persons under the old age pension law.

The board is working out this new law in combination with the bureau of internal revenue which is charged with gathering the taxes.

All kinds of queer and unforseen cases have been coming to the attention of both of these bodies during the past few weeks and many more will be reaching them from time to time. All of this will take a lot of work and time to get straightened out and many feel that possibly the actual administration of the law cannot be begun Jan. 1. However, if there is to be any postponement something will have to be done shortly after congress convenes Jan. 5 because employers are supposed to deduct from salary checks payable Feb. 1.

The whole situation is confused and there is every indication that no matter how carefully the board and bureau prepared for this work they will be miles behind the procession.

FREIGHT SURCHARGES LIKELY TO BE EXTENDED INTO 1937

There is a general feeling here that the interstate commerce commission will allow railroads to continue their emergency freight surcharges after Dec. 31, when they are timed to expire. This will be done because several members of the commission believe the roads are entitled to some additional compensation until the commission reaches an agreement on the rate increase case which the roads have recently put up to the commission.

Arguments on temporary extension of these surcharges are to be heard before the commission in a few days and there is every indication that the commission will reach its decision—believed to be favorable—before Dec. 31.

The idea is that the commission will allow the surcharges to continue only until the commission has handed down its decision in the general freight rate increase rates on which hearings are also to commence shortly.

LABOR PUTS STRAW MAN BEFORE LA FOLLETTE PROBE

Hearings before what has popularly become known as the LaFollette committee on civil liberties will probably not be resumed until congress convenes, it is now stated by officials of the committee.

This committee, of course, is the subcommittee of the senate committee on education and labor, and the subcommittee is headed by Senator LaFollette of Wisconsin.

It is reported here that investigators for the committee are still in the field and they are said to have spent much time in and around steel mills. There has already been some testimony before the committee in connection with the steel strikes and there will be more before the committee completes its work.

Apropos of the work of this committee the A. F. of L., in order to make the headlines, instigated some talk on the floor of the Tampa convention to the effect that industrialists will make a desperate effort at the coming session of congress to see that this subcommittee does not get any more money with which to continue its work.

TIN PLATE SCRAP EXPORT LICENSE PLAN WORKS WELL

New regulations and quotas have to be put into effect Jan. 1 by the state department for exporting of tin plate scrap, which is now exported under license, in accordance with a law passed at the last session of congress.

In this connection it is understood that some kind of an announcement will be forthcoming from the state department within the next week or so.

There have been no protests on the quotas set effective July 1 for six months and it is believed the quotas to be set for the coming year will be just twice what the previous six months period called for. It is expected that everything will work along the way it has during the past six months but it is reported that there will be some changes in the regulations, although what these will be cannot be learned at this time.

SPANISH ORE HELD BACK

As a result of interruption of exports of iron ore from Spanish Morocco large stocks of ore have accumulated in that area, according to a report from Consul H. A. Doolittle, Tangier, to the commerce department.

There is only one producing company in the country at present and it is controlled entirely by Spanish capital and operates under the direction of an American engineer. Its daily production is estimated at approximately 2000 metric tons. Iron ore accumulated at the mines and the loading tips at Melilla aggregates some 300,000 tons, the report states.

Practically all the iron ore mined in Spanish Morocco, the report points out, is shipped outside the country, at least 90 per cent being sold in various European countries with England and Germany the chief purchasers. Since the present conflict started only 70,000 tons have been exported to Germany, it was stated.

Reserves in Spanish Morocco estimated at 25 million tons are still untouched. This mineral might be of interest to American smelters on the Atlantic coast if bottoms could be found for economical transportation, according to the report.

Editorial

Where Will Government's Present Labor Policy Lead?

SINCE 1932 the present administration in Washington has been evolving a policy of government influence in the relations between employers and employes. During these four years the nation has been watching the experiment intently, trying to deduce from day-to-day developments the final objective of those who draft and administer the government's labor program.

From the abundance of evidence gained through experience with labor-sponsored legislation it is not difficult to detect certain indications of purpose on the part of new dealers. Unquestionably they desire to effect government control of hours and wages. They want to establish the principle of collective bargaining. Also they seek to help organized union labor to "organize" open shop industries and they are trying to discourage employe representation plans.

The administration tries to justify these desires on the ground that they are essential to the success of the major social objective of the new deal, which is to provide a more equitable distribution of wealth.

No one will quarrel with the merit of this general social objective, but one may properly question whether some of the features of the administration's labor program will really assist a fairer distribution of goods.

Before Committing Nation to Arbitrary Policy We Should Study Where It Will Lead Us

Before this nation becomes too thoroughly committed to the present trend in labor policy, government representatives, employers and employes should take time enough to get their bearings and to consider carefully whether the present charted course is safe. Above all, they should ask themselves whether they know definitely where the present policies will lead.

Unquestionably the basic problem is that of the balance of power between employers and employes. Throughout the world there is a well defined movement to place employes on a par with employers in negotiations affecting hours, wages and working conditions. Intelligent industrialists recognize the force and spirit of this movement and are alive to the necessity of solving the problems it presents.

This introduces the question of method, which, in the United States, will prove to be the most troublesome bone of contention in the labor relations situation. Can the rights of employes be properly safeguarded under the present system of comparative freedom for either open shop or closed shop conditions, or will it be necessary to swing over to the single standard of a closed union shop?

While the present government administration has not declared its position on this important question, its actions to date hint strongly that it prefers the closed shop status.

Government representatives, employers, employes and the public at large should consider carefully whether conditions in this country would be improved by continued artificial stimulus to the organization of employes by professional labor unions. What will we gain, or what will we lose by continuing our present policy of favoritism toward one kind of professional organization?

Can We Afford To Destroy the Natural Traits of Co-operation Between Employers and Employes?

We need not go far afield to find the answer. In the United States are numerous industrial areas with varying degrees of unionization. Compare the so-called closed shop cities with the cities in which industry is predominantly open shop. Look into the questionable alliances between employer groups and employe unions in closed shop localities, witness the stultifying effect it has upon business and then ask whether this condition should be made nation-wide?

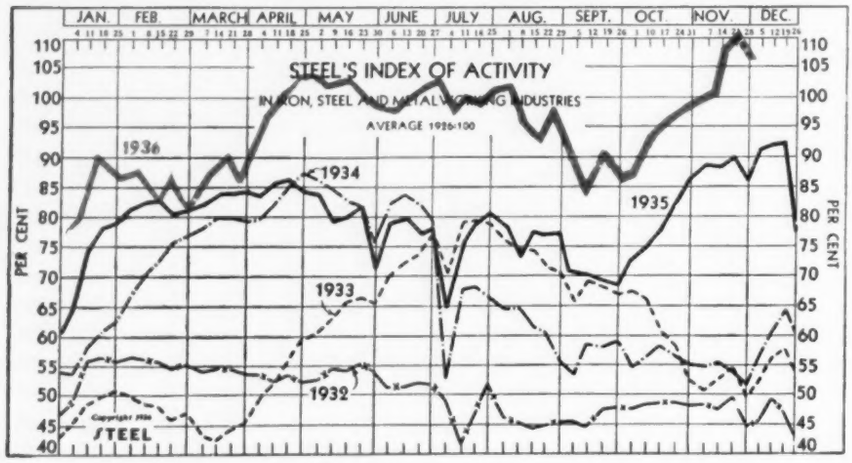
Next consider the psychological aspects of a condition of complete union domination. Recently a young man, 20 years old, was encouraged by his parents and friends to go to sea as an apprentice seaman. They thought that the discipline under a good master and mates would provide excellent experience for the lad. The boy has returned from his first extended cruise. Instead of the anticipated discipline, he experienced a situation in which the crew was openly hostile to the officers and to the shipowners. From the moment he stepped on board, the lad was subjected to a constant stream of union-sponsored poison against officers and employers.

Most men in the generation preceding that of this boy took up their first employment with a spontaneous loyalty to their employers, which continued as long as they were dealt with fairly. They had a pride in craftsmanship and a zeal for the success of the business in which they were engaged. Shall we try to preserve the natural trait of co-operation of employe with employer, or shall we interpose an outside agency which cannot help but drive an ugly wedge between the two principal parties?

In America, every man is free to worship in the church of his own selection. Millions have braved hardship to come to our shores to gain this freedom.

Why can't we preserve this same degree of freedom in the relations between employe and employer? Let the employe decide freely how he shall bargain with his employer!

THE BUSINESS TREND



STEEL'S *index of activity in the iron, steel and metalworking industries declined* 3.7 *points to* 106.2 *in the week ending November* 28:

Week ending	1936	1935	1934	1933
Aug. 29	94.0	77.3	55.1	70.3
Sept. 5	87.5	70.9	53.5	65.5
Sept. 12	83.1	70.1	58.7	69.1
Sept. 19	90.1	69.4	58.1	68.2
Sept. 26	86.2	68.5	59.3	66.9
Oct. 3	89.0	73.3	54.7	67.4
Oct. 10	93.4	74.9	56.4	66.0
Oct. 17	95.5	77.4	58.2	60.9
Oct. 24	97.1	82.4	56.3	58.0
Oct. 31	99.1	86.4	55.0	52.3
Nov. 7	102.1	88.4	54.9	50.7
Nov. 14	107.9	88.8	55.2	52.6
Nov. 21	109.9†	90.9	54.4	55.4
Nov. 28	106.2*	86.0	51.9	49.7

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL). *Average for* 1926 *equals* 100, *weighted as follows: Steel rate* 40, *and car loadings, power output and auto assemblies each* 20.

Steel Rate Ignores Holiday As Other Barometers Dip

AS WAS to be expected the record of industrial activity in the week ending Nov. 28, which included Thanksgiving day, showed a moderate recession from that of the preceding week. STEEL'S index stands at 106.2, as compared with 109.9 in the week ending Nov. 21.

Steelworks operations proved to be the single outstanding exception to declines in the various barometers. The operating rate was up from 74.5 to 75.5 per cent of capacity, reflecting the effect of continued strong demand for steel. A new flurry of railroad buying, involving cars, locomotives and rails, has brought cheer to the producers of heavy forms of iron and steel.

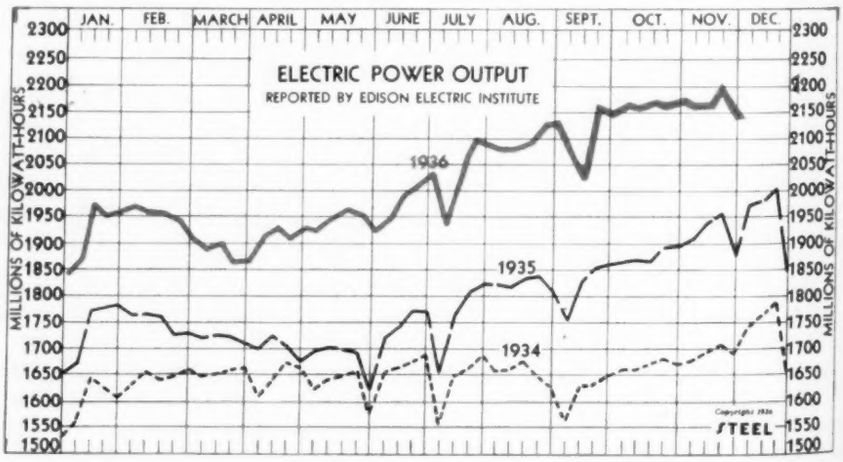
Always susceptible to holiday interruptions, revenue freight car loadings declined sharply from 790,000 to about 700,000 cars. Electric power output receded only moderately from the all-time high established in the preceding week.

The behavior of automobile assemblies, while largely due to the holiday, will bear close scrutiny. Output in the week ending Oct. 21 was 110,160 cars and in the week ending Oct. 28 104,283 cars. This recession is moderate enough to correspond with the declines in Thanksgiving weeks in previous years, yet there is a possibility that the normal rebound, which should occur in the week ending Dec. 5, will be affected by suspensions due to labor trouble in plants of partsmakers.

Strikes may affect the business trend over the remainder of the year. The difficulty at Pacific, Gulf and Atlantic ports already has interfered with the movement of certain materials. Should the present tie-up at Midland be followed by similar closings of bottlenecks of supply to the automobile industry, activity generally would be seriously handicapped.

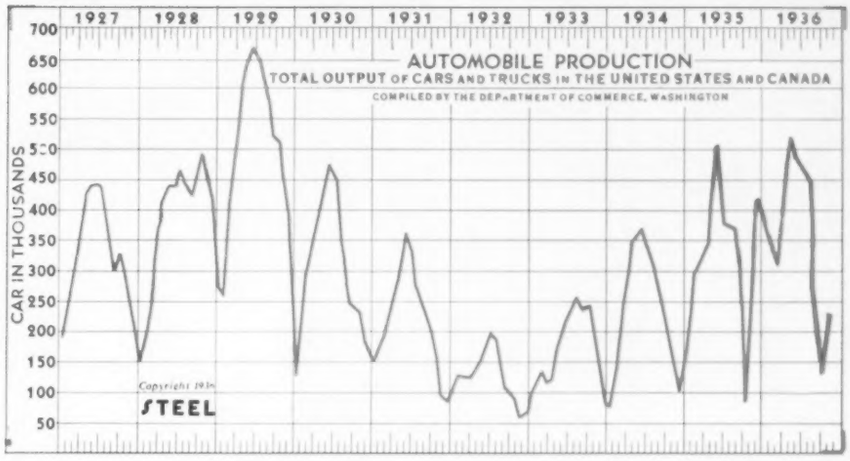
Millions Kw.-Hrs.

	1936	1935	1934	1933
Nov. 28	2133	1876	1683	1554
Nov. 21	2196	1953	1705	1608
Nov. 14	2169	1938	1691	1617
Nov. 7	2169	1913	1675	1617
Oct. 31	2175	1897	1669	1583
Oct. 24	2166	1895	1677	1621
Oct. 17	2170	1863	1667	1618
Oct. 10	2168	1867	1658	1656
Oct. 3	2169	1863	1659	1646
Sept. 26	2157	1857	1648	1652
Sept. 19	2170	1851	1630	1638
Sept. 12	2028	1827	1633	1663
Sept. 5	2098	1752	1564	1582
Aug. 29	2135	1809	1626	1637



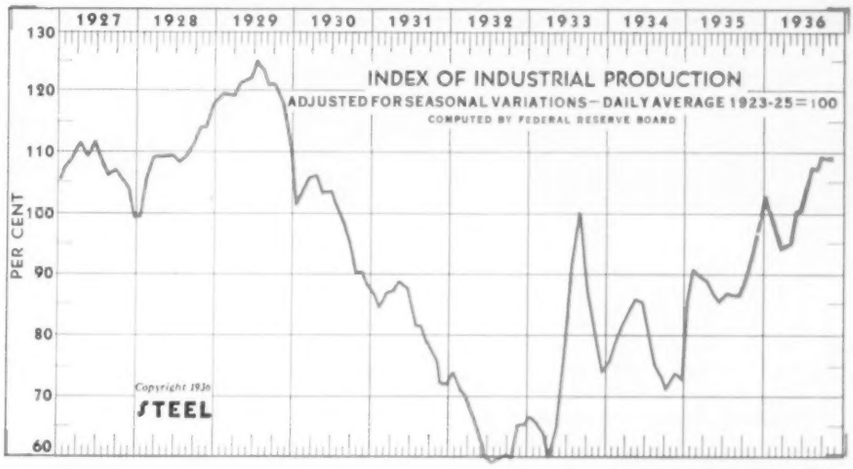
Automobile Output Points Upward in October

	1936	1935
January	377,306	300,325
February	300,874	350,345
March	438,945	447,888
April	527,726	477,059
May	480,571	381,809
June	470,887	372,085
July	451,474	345,178
August	275,951	245,092
September	139,785	92,863
October	229,989	280,356
November	.....	408,555
December	.....	418,303


1927 1928 1929 1930 1931 1932 1933 1934 1935 1936
AUTOMOBILE PRODUCTION
TOTAL OUTPUT OF CARS AND TRUCKS IN THE UNITED STATES AND CANADA
COMPILED BY THE DEPARTMENT OF COMMERCE, WASHINGTON
CAR IN THOUSANDS
700 650 600 550 500 450 400 350 300 250 200 150 100 50
Copyright 1936
STEEL

Industrial Production Index Remains Unchanged in October

	1936	1935	1934	1933
January	98	91	78	65
February	94	89	81	64
March	93	88	84	60
April	100	86	85	67
May	101	85	86	77
June	103	86	84	91
July	107	86	75	100
August	108	87	73	91
September	109	89	71	84
October	109	95	73	77
November	..	98	74	73
December	..	104	86	75


1927 1928 1929 1930 1931 1932 1933 1934 1935 1936
INDEX OF INDUSTRIAL PRODUCTION
ADJUSTED FOR SEASONAL VARIATIONS—DAILY AVERAGE 1923-25=100
COMPUTED BY FEDERAL RESERVE BOARD
PER CENT
130 120 110 100 90 80 70 60
Copyright 1936
STEEL

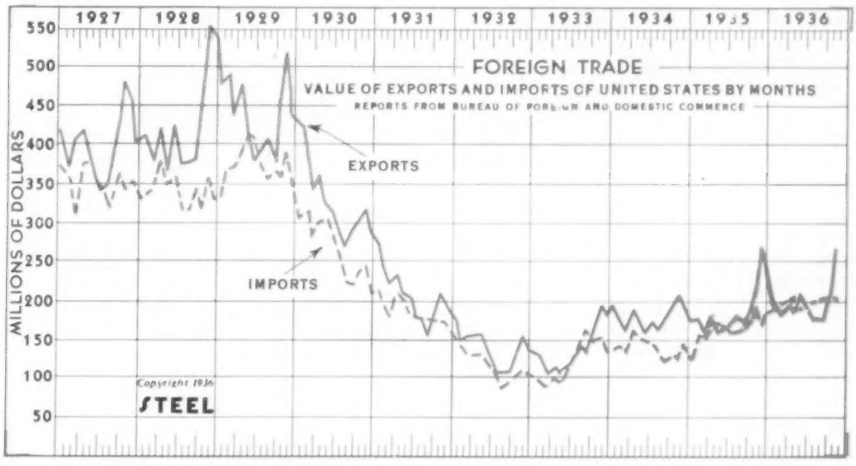
October Building Awards Show Moderate Gain

	Square Feet		
	1936	1935	1934
Jan.	27,053,300	11,245,100	9,568,700
Feb.	20,856,700	9,670,300	8,176,300
Mar.	31,308,100	15,845,300	14,788,900
Apr.	37,490,200	19,917,300	14,207,100
May	36,362,700	22,276,200	14,664,400
June	36,883,900	22,878,800	13,986,500
July	38,762,500	21,565,900	13,250,000
Aug.	40,285,100	21,545,400	14,259,000
Sept.	35,448,000	21,365,700	12,510,300
Oct.	36,718,900	27,775,900	15,098,100
Nov.	.....	24,120,700	12,780,800
Dec.	.....	33,441,900	9,188,700

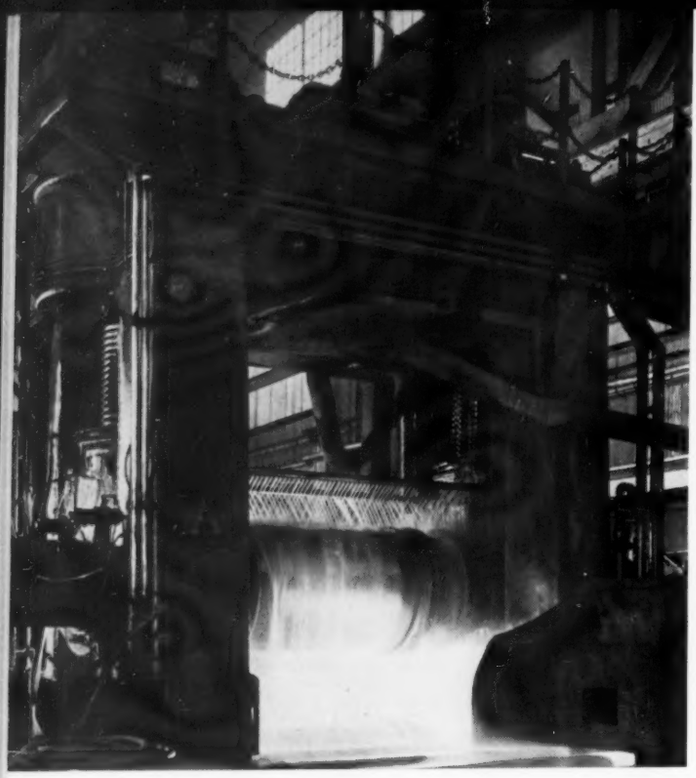
1927 1928 1929 1930 1931 1932 1933 1934 1935 1936
BUILDING CONSTRUCTION
CONTRACT AWARDS IN 37 STATES
COMPILED BY F. W. DODGE CORP.
MILLIONS OF SQUARE FEET
100 90 80 70 60 50 40 30 20 10
Copyright 1936
STEEL

Merchandise Exports Up Sharply in October

	Dollars (000 omitted)			
	1936		1935	
	Exports	Imports	Exports	Imports
Jan.	198,654	187,482	176,223	166,993
Feb.	182,030	192,771	162,999	152,491
Mar.	194,790	198,686	185,603	177,279
Apr.	193,490	202,437	164,350	170,567
May	201,042	191,110	165,457	170,207
June	185,188	192,233	170,193	156,756
July	178,324	193,409	173,371	177,698
Aug.	178,249	195,016	172,128	169,030
Sept.	219,976	215,525	198,189	161,653
Oct.	264,708	212,001	221,215	189,240
Nov.	.....	.....	269,400	168,955
Dec.	.....	.....	223,737	186,648


1927 1928 1929 1930 1931 1932 1933 1934 1935 1936
FOREIGN TRADE
VALUE OF EXPORTS AND IMPORTS OF UNITED STATES BY MONTHS
REPORTS FROM BUREAU OF FOREIGN AND DOMESTIC COMMERCE
MILLIONS OF DOLLARS
550 500 450 400 350 300 250 200 150 100 50
EXPORTS
IMPORTS
Copyright 1936
STEEL

Inland's New 43-Inch Is Served by



Approach side of reversing blooming mill equipped with rolls 42 x 100 inches and driven by a 7000-horsepower motor

INSTALLATION of four open-hearth furnaces, nine circular soaking pits and a blooming mill constitutes the major portion of a plant extension program carried out recently by Inland Steel Co., Indiana Harbor, Ind. The new 125-ton furnaces are located in an extension of the No. 2 open-hearth building, which formerly housed 15 units, and were built in line with the old furnaces on 80-foot centers—a condition necessitated by adherence to previous building design. A mixer pit is served by Pugh-type ladle mixers from which hot metal is apportioned to the furnaces. Each furnace hearth measures 16 x 43 feet, while the bath depth is 33 inches. Hearth area is equivalent to 4.15 square feet per ton of steel produced.

Design of Furnace Bottoms

In order to give the desired bath depth, as well as extra brick below the tap hole and economy in depth of magnesite at the ends, the furnace bottom supports were located so that a section 5 feet on both sides of the tap hole is depressed 5 inches. Chill boxes are shallow, while girders have supplanted truss design. Girder webs consist of plates separated by spacers with openings for air cooling. Furnace bottoms are made up first of insulating brick followed by successive layers of firebrick, chrome brick, chrome plastic and magnesite.

Roofs are formed principally of 16-inch silica brick, with 22½-inch brick used above the tap hole. Insulation is a 1-inch thermoflake coating overlaying 2 inches of thermoflake granuals. Buckstays supporting the sides, ends and sloping backwall were formed from slabs cut and welded. Firebrick paneled doors, equipped with water-cooled frames and mullions, are operated by push button control. Oil burners may be raised and lowered and are located in a water-cooled, welded steel plate housing situated in the centerwall between the uptakes.

Gas Spread Is Uniform

Slag pocket side and endwalls are insulated by 18 inches of silica and clay brick, while the floor consists of 9½ inches of clay brick. Gas flowing from the slag pockets to the regenerators passes beneath a flat suspended arch which also extends over the regenerator. Better heat distribution in the regenerator is expected to result from the uniform spread of gas under this arch.

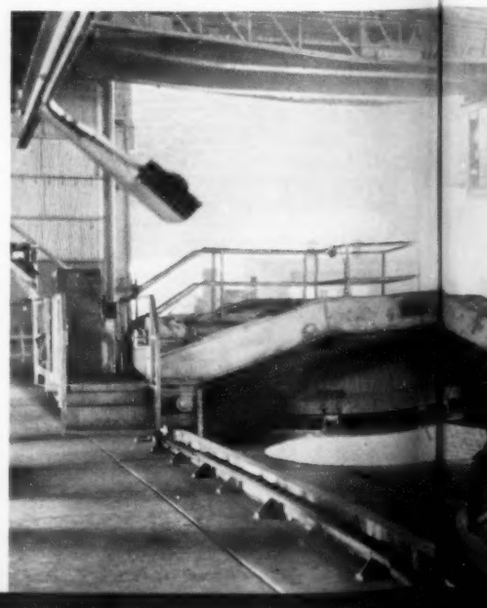
Regenerators are 20 feet 3 inches by 24 feet 9 inches and measure 18 feet 6 inches from floor to top of checkers. Thickness of the suspended flat arch roof is 12 inches, while sidewalls are 22½ inches thick and the floor is 4½ inches thick. Exterior surfaces are insulated.

Opposite each furnace are a superheater, waste-heat boiler and motor driven induced draft fan. Usually waste gas is drawn through the boiler but it may be by-passed direct to the individual stack in the event of interruption to service of either the superheater or boiler.

Fuel oil is circulated up to the control panel at 180 degrees Fahr. The oil flow, adjusted by micrometer valves, is indicated and recorded at the control panel on which also is located an indicator operated from an air-flow meter. Checker temperatures also are recorded. Electrically-controlled reversals are synchronized to cause one set of valves to open as the other set closes. Provisions also have been made to burn tar and gas, if desired.

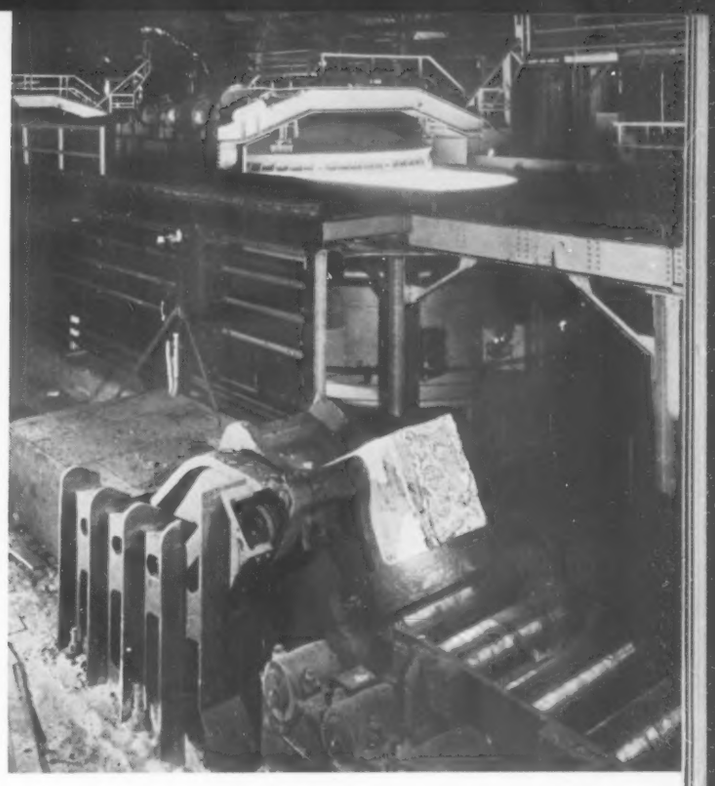
Adjacent to the open-hearth building extension is a new stripper building, 62 x 140 feet. This is served by a 200-ton crane designed with two towers, one of which is used for stripping and one for

Interior of soaking pit building showing cover of one of the nine circular furnaces partially removed



2-High Blooming Mill

Circular Pits

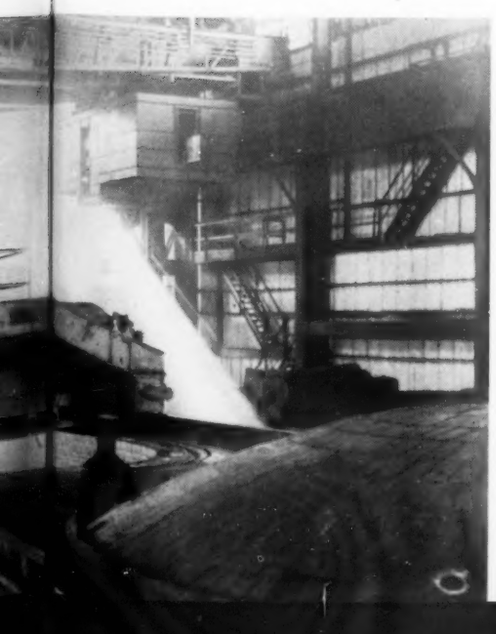


Circular soaking pit shown in background and ingot chair about to deposit heated ingot on blooming mill approach table

spotting ingots in cars for transportation to the blooming mills.

In the new soaking pit building the nine Salem circular pits are located in a row, with the lower pit floor about 11 feet below the working floor. Each pit is 16 feet diameter for a distance 3 feet from the top. From the bottom of this section the wall slopes outward for the next 3 feet, below which it is again vertical. Each of the 15 burners is set at an angle of 38 degrees. This imparts a whirl to the flame and products of combustion and works them to the top of the pit where the gas is directed toward the center. The gas then is started downward to the flue opening in the center of the pit bottom.

The pits were installed without recuperators, but provision has been made for erection of waste-heat boilers. Three cover cranes travel on rails secured to the working deck. Since the pits are circular, it is unnecessary to uncover more than one-half the top when charging or withdrawing, thereby conserving heat.



All oil, gas and air lines are of welded construction. Pit burners are of the combination type and can burn either oil or coke-oven gas. At present six pits are gas fired and three are oil fired.

Controlled Atmosphere Used

Atmosphere and temperature are controlled automatically throughout the heating cycle. Furnaces are kept under balanced draft with 1 to 1½ per cent combustibles in the waste gas, a practice which reduces scale formation. Steel jacketing, thorough insulation, and sealing of openings for burners and other purposes make for low fuel consumption and aid the effectiveness of the various controls.

Preliminary operations indicate each furnace capable, without forcing, of heating 15 tons of ingots per hour. In heating 21,000 pound ingots, measuring 26 x 54 x 70 inches, these furnaces show that cold ingots can be successively charged, once the units have been brought up to temperature. A charge for one furnace consists of eight ingots, with the heating time approximating the lapse from the open-hearth tap to the soaking pit charge. Normal combustion chamber temperature is 2450 degrees Fahr.

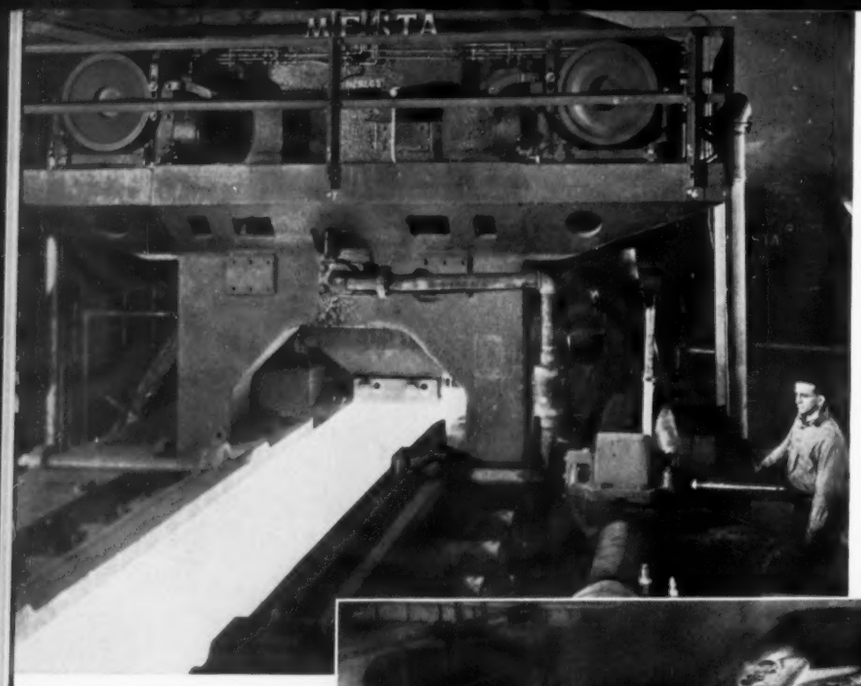
The Mesta bloomer, or slabbing mill, employs 43 x 100-inch rolls and is driven by a 7000-horsepower motor. Electrically-operated manipulators are located on both the entry and delivery sides of the mill. Preceding the front manipulator are nineteen 18-inch rollers, followed by eighteen 20-inch rollers.

After the slab has been rolled, it travels to the runout table, past a gage beam and to the Mesta slab shear. Crop ends drop to a conveyor extending beneath the operation floor and are discharged into a pit. After shearing, the slabs are weighed and then moved by a pusher to the transfer and cooling bed. Following inspection, delivery finally is made to the piler table. Cranes remove groups of slabs from the piler and place them for storage, chipping or scarfing as required. These cranes also are used to charge the slab-heating furnace which serves the hot strip mill. The latter is located in line with the 46-inch slabbing mill.

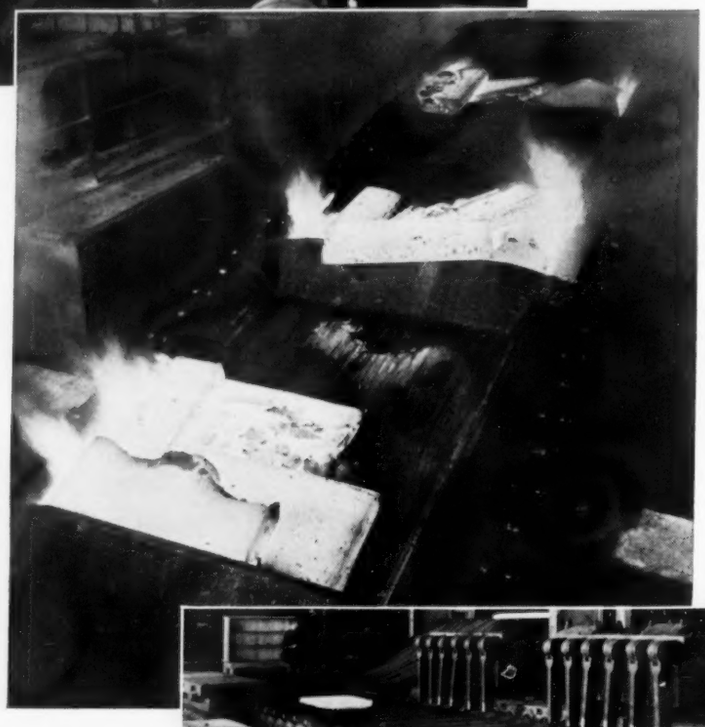
Bearings and Lubrication

All table rollers are equipped with roller bearings, while the bearings of the mill itself are babbitt-backed bronze. All moving parts of the mill are operated with automatic pressure lubrication. Water troughs extend the full length of the roller stands, permitting scale to be washed into pits.

The crop pit, built with reinforced concrete walls and floor, is located outside the mill building. A bed of old rails protects the floor, while the inside walls are lined with steel sheet piling. Space between the concrete and piling is filled with crushed slag which acts as a cushion. As the crops are re-



Motor-driven shear for cropping ends of slabs coming from the blooming mill



Slab croppings on their way from the shear to a pit on the exterior of the building

Inspection and piling table. Slabs are transferred in batches to storage by overhead traveling cranes

ceived, a gate throws them to one side or the other, so that half of the pit can be emptied by a lift magnet while the other half is being filled. Streams of water cool the crops.

These additions to Inland's mill facilities, particularly the straight-line layout from soaking pits through the hot strip mill, not only provide larger steelmaking capacity but also have an important influence on quality of product and the planning of schedules.

Solves Welding Problem

The welding department of a large tire and rubber company in Ohio was experiencing difficulty in oxy-acetylene welding high speed steel to machine steel. This job had been attempted several times with little success, the failures being due to the welds cracking directly through the center.

A welding service man was consulted and he tried the job with several electrodes without success. Then he tried 25-12 stainless steel electrodes and after the parts had cooled no evidence of fracture was found. The piece was subjected to test and stood up satisfactorily. The company is continuing to use 25-12 stainless steel electrodes for this particular application.

Studies Micro-Plasticity In Crystals of Tin

Many problems relating to the fundamental properties of the metallic state best can be approached through experimental investigations on single crystals of metals. In an investigation by Bruce Chalmers, B.Sc., Ph.D., the nature and characteristics of the yield point were examined to find out whether the value obtained from the yield point is real or a function of the accuracy of measurement. Relations between tension, length and time for single crystals of tin of high purity were measured by an optical interference method. Several new phenomena have been noticed, especially plasticity below the accepted yield point, called by the author "micro-plasticity." Results are discussed in relation to both slip and distortion within the crystal space lattices. Results of this investigation have been published by International Tin Research and Development council as Series A, No. 44. Copies are available from L. J. Tavener, American representative of the council, 149 Broadway, New York.

Materials Handling

Mechanical Handling Proves Worth In Eliminating Hernia Hazard

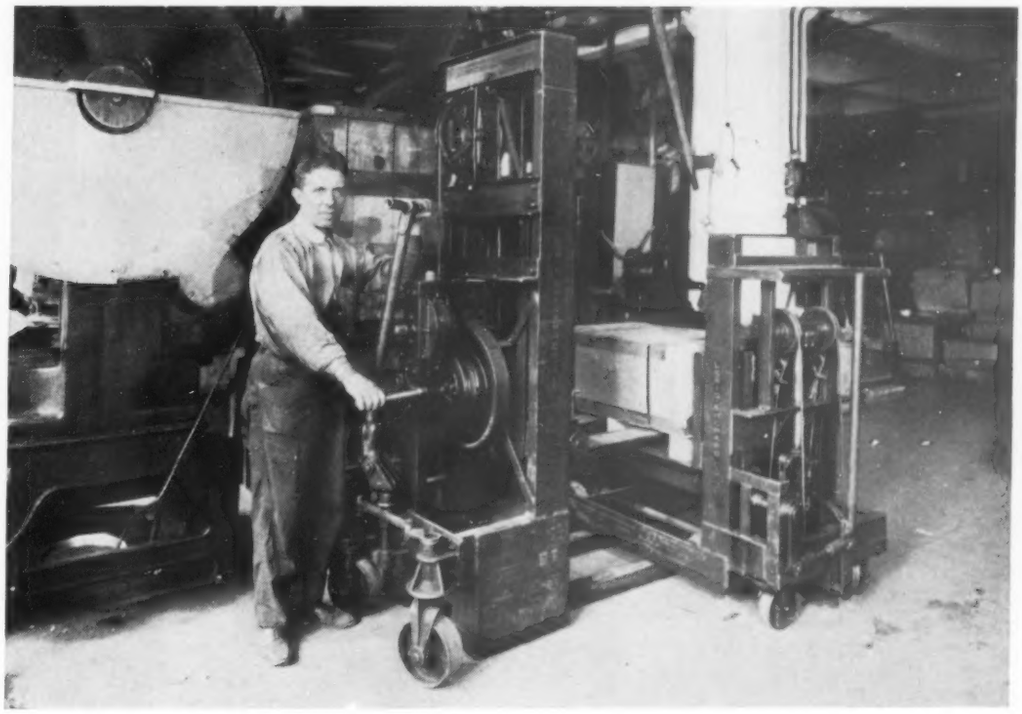
AMONG enthusiastic believers in the efficiency and economy of materials handling equipment is V. K. LeComte, president, LeComte & Co., tin can manufacturer of Brooklyn, N. Y. During the past few years since he has installed in his factory more and more heavy lifting devices, he has been relieved of what was becoming a source of grave concern to him, namely, an increasing hazard to his old employes.

In the case of Mr. LeComte, this was serious business because, while he was a youngster and accustomed to dropping in to visit his father's factory, many of these same workmen were familiar figures to him, for while the business of the company is not large as compared to some members of the can industry, working at various positions throughout the plant are men who have been employed since the company was started by Mr. LeComte's father, and few indeed among the employes who have not been in the service for 10 or 12 years.

In an interview Mr. LeComte stated: "A few years ago when we were still using in large part manual handling methods, we began to be alarmed over the number of our men who reported to us with hernia. An investigation showed that overlifting was the apparent cause of this ailment. You see, the tin plate arrived in large boxes and a couple of men would remove one of these units and toss it up on the pile. They never suspected that they were straining themselves, and we certainly did not. Now, that has been placed in the past history of the business because since the introduction of mechanical handling, we have not had a single case of hernia, or other similar complaint, among our men.

Insurance Rates Drop

"Furthermore, we effected a considerable saving in insurance premiums, which, at best, are rather steep in a tin plate using factory. One other accomplishment we attribute to the use of the new materials handling equipment—we found that we could get more tin plate into storage by reason of higher stacking. This storage problem had given us great concern previously, and it had finally come



A HIGH tiering stacker is used to pile skid units of tin plate in the storage areas and to transport units to the various machine stations and there transfer them to other portable units

MATERIALS HANDLING

DESIGNED specially for handling small billets in lengths from 6 to 30 feet long, this chain-driven conveyor operates at a surface speed of 431 feet per minute

to the point where we had to consider securing additional factory space. The higher stacking made possible under the new system of handling made this additional rental expense unnecessary."

Alex Champa, superintendent of the LeComte plant, who has been with the company nearly 30 years, is also enthusiastic about the system. He says that in a can factory, materials handling is all-important, not only from the standpoint of employe welfare, which is sufficient in itself to warrant constant study of handling practices; but, because incoming materials generally are very heavy, while the outgoing finished products are "mostly air."

The arrangement of the company's factory is ideal for the operations of canmaking and particularly for smooth-flow handling. Tin plate and other raw materials are received at one side of the factory where a large receiving room door opens onto a platform along a switch-track. The factory, located in a first floor space in one of the Bush Terminal buildings at 147 Forty-first street, contains approximately 25,000 square feet of floor space.

The most important incoming item, naturally, is tin plate. This arrives in carload lots in 10-box units, each such unit being wrapped in protective paper and wire-tied, or steel strapped, to wood skids with approximately 4-inch clearance. A hand-lift truck is used for

(*Please turn to Page* 81)

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Conveyor for Hot Billets

IN AN Eastern steel mill, handling of hot billets is now being accomplished on a special conveyor which was developed by the Mathews Conveyor Co., Ellwood City, Pa., for this particular operation. The billets are of various sizes, anywhere from 6 to 30 feet in length, and are either 2 x 2-inch or 4 x 4-inch square. The conveyor, shown in the accompanying illustration, incorporates 4-inch diameter rollers equipped with precision bearings. It is chain-driven, operating at a surface speed of approximately 431 feet per minute.

This unit is not to be construed as a device for handling heavy billets found in everyday steel mill production; rather, it illustrates how a special handling operation may be performed more efficiently by a conveyor especially designed for it.

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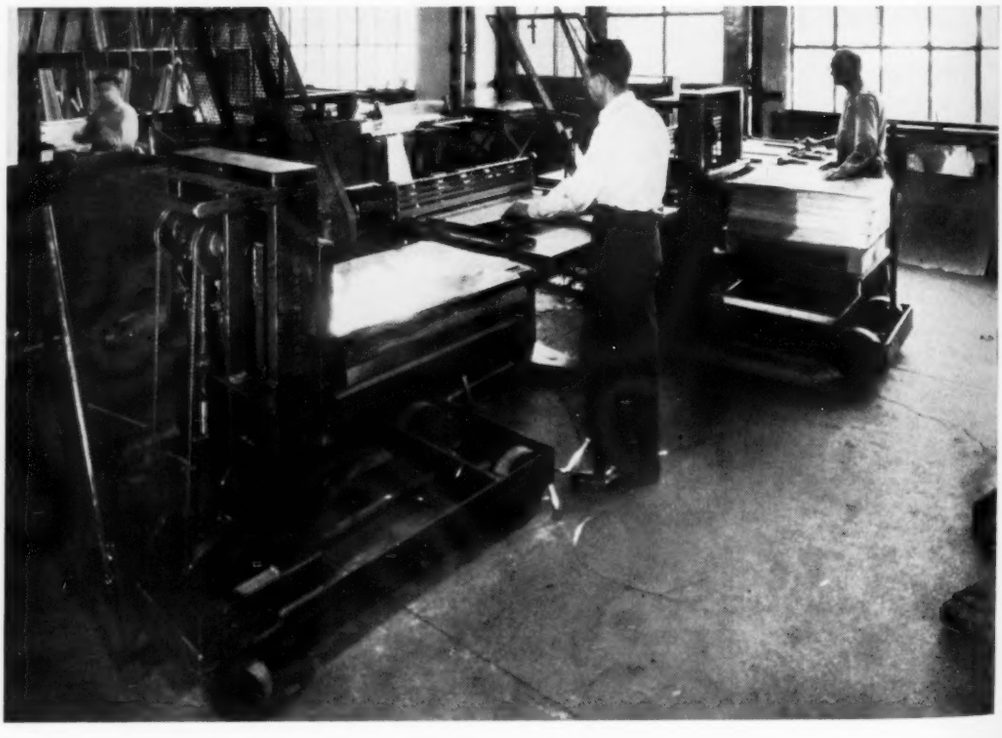
SLITTING machine operators keep the tin plate at convenient height by means of portable stackers. Twelve of these stackers are in use in the LeComte factory at present. Photo courtesy Lewis-Shepard Co.



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A.S.M. Symposium Broadens Knowledge on Plastic Working of Metals

Part II

DISCUSSION of plastic working would not be complete without proper consideration of hammer and press forging, cold heading, cold forming and cold rolling. These subjects, therefore, were given their apportioned share of atention during the four-session symposium on the plastic working of metals conducted by the American Society for Metals during its eighteenth annual convention in Cleveland, Oct. 19-23. A report on the early part of this symposium was presented on page 56 of the Nov. 23 issue of STEEL.

Successful manufacture of forgings is the result of close co-operation between steel manufacturer, designer, machinist and forger. This was the assertion of Adam M. Steever, superintendent, Columbia Tool Steel Co., Chicago Heights, Ill., who contributed a most practical paper on factors relating to the production of drop and hammer forgings. With continued co-operation in these industries, a superior metallic shape can be manufactured without question.

Importance of Forgings Cited

The author was of the opinion that the forging industry has contributed largely to the success of the automotive and other allied industries; also, that it is one of America's greatest assets for the production of munitions for national defense and as such has a secure future for continued success.

In describing the various types of forging equipment, Mr. Steever touched upon the importance of die manufacture, maximum forging temperatures, finishing temperatures and grain flow. See accompanying illustrations, Figs. 1 and 2. Tables showed maximum forging temperatures for some types of metals and curves showed steam consumption of steam hammers under varying conditions. The author also discussed metallurgical factors that must be considered and controlled for fabrication of satisfactory forgings.

Commenting upon Mr. Steever's paper, J. A. Succop, Heppenstall Co., Pittsburgh, stated that an important component of the drop hammer unit is the die block, which part is being constantly replaced due either to wearing out of the depression or to a change in die design. From the plain carbon steel, longitudinally-forged, unheat-treated block, evolved the special alloy upset forged and hardened and tempered block. The most generally accepted analysis of today's highest quality die block is nickel-chromium-molybdenum. This chemical composition has proved to possess those properties required, namely, resistance to impact, abrasion and checking at elevated temperatures, and minimum of distortion at high hardness.

To obtain impact resistance in both the longitudinal and transverse direction, it is necessary to upset forge the block during the press forging operation, distorting the original ingot fibers so that the completion of the several upsetting operations, the die steel contains a minimum of directional properties. When the die is in service, impact stresses are absorbed by the block in all directions, therefore, only a quality block can successfully withstand these stresses equally both transversely as well as longitudinally.

Mr. Succop ventured that 90 per cent of the tonnage of all die blocks is purchased in the hardened and tempered condition. The annealed type, hardened by the customer, is sold only for shallow impressions and then the service requires a hardness above the commercial machinable hardness, which is normally accepted as 429 brinell with a 2.95 ball diameter, or 60 scleroscope.

Contributing a paper on hot press and upset forging, J. H. Friedman, vice president, National Machinery Co., Tiffin, O., stated that press forging and upset or machine forging are essentially one and the same process. While the equipment used is totally different in appearance, the press and forging machine perform their work in tthe same manner, that is, by preliminary or gathering operations and final or finishing operations.

Two Methods Differ

The principal difference between the two methods is that the forging press generally employs solid dies, whereas the forging machine uses split dies. Also, the hot stock for the press is generally in the form of cut planks or slugs, while bar stock is used in the forging machine. It is true, asserted Mr. Friedman, that split dies and bar stock are sometimes used in the forging press, and solid dies and cut blanks in the forging machine, but such applications are the exception rather than the rule.

There is no fundamental difference, the speaker observed, between

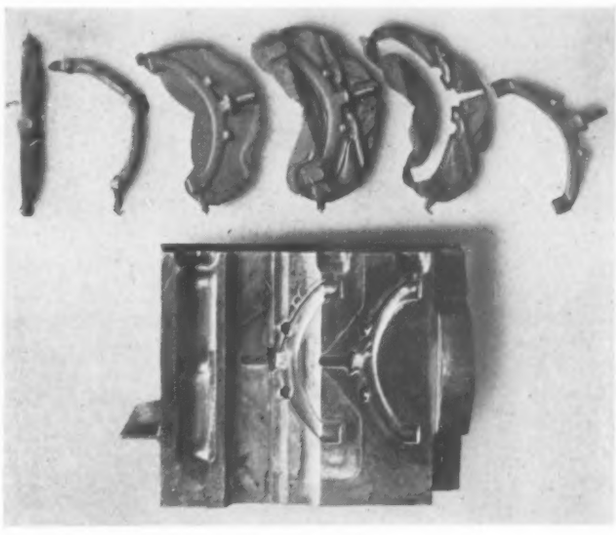

FIG. 1 — The various operations involved in drop forging are shown in this illustration of a die and its impressions. From paper of Adam A. Steever

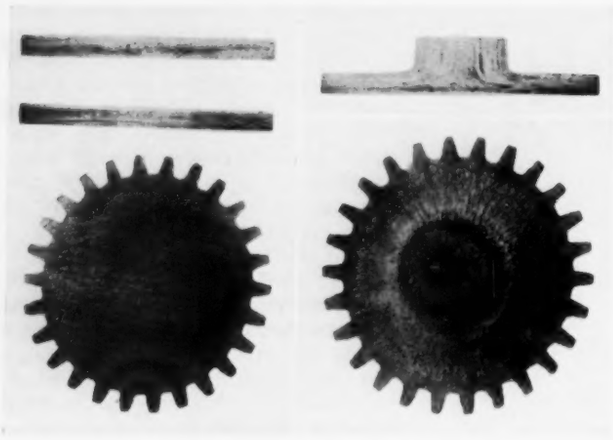

FIG. 2—Grain flow in a forging indicates the method of handling under the hammer. The gear at the left was forged longitudinally, the one at the right was upset. From paper of Adam A. Steever

press and machine forging as regards control of fiber flow lines, grain size for density and warpage and the temperatures used in forging. Grain size for machinability and warpage is a factor that can be controlled only by the user. Investigations along this line seem to indicate that a dense forging machines easier and there is less tendency for warpage in subsequent heat treatment than is encountered with a more porous forging. There is also some evidence to show that density depends upon the character of the steel from which the forging is produced, the temperature at which it is forged, and the design of the dies. See accompanying illustrations, Figs. 3 and 4.

The term extrustion as applied to metals and alloys comprises essentially the application to a relatively massive billet or blank sufficient pressure to cause the metal to flow through a restricted orifice, thereby forming a greatly elongated section of uniform but relatively less massive volume, explained D. K. Crampton, director of research, Chase Brass & Copper Co., Waterbury, Conn., in presenting a paper on extrusion of metals.

Explanation of Extrusion

Extrusion may be either hot or cold. Hot extrusion indicates that the metal is above its recrystallization point and thus continuously recrystallizes and is not work hardened during the process. All rod and all medium and large-sized tubes are extruded hot. Cold extrusion indicates that the metal never reaches the temperature of incipient recrystallization. Therefore, it may be considerably work hardened by the process.

The extrusion of lead and some lead alloys was introduced at about the beginning of the nineteenth century, and for many years only low melting point soft alloys were so treated commercially. It was not until near the close of the nineteenth century that a copper-base alloy was successfully extruded at a relatively high temperature. During the last 20 years, especially, great strides have been made in the equipment, processes, handling and treatment of alloys during and subsequent to the extrusion process. As a result, many alloys and shapes are now extruded commercially which heretofore were considered impossible or impracticable. Some examples are shown in Fig. 5.

Both mechanical and hydraulic extrusion presses are used but the tendency today is almost exclusively toward the hydraulic type, said Dr. Crampton. The latter are more flexible, compact, easier to control, and less subject to damage from improper operation. The presses most used at present vary in capacity from about 200 tons to 4000 tons.

Two processes are employed for cold extrusion, namely, the Hooker process and the impact process, the speaker continued. In the Hooker process, relatively heavy walled cup-shaped blanks are extruded at high speeds, using ordinary crank presses instead of the usual extrusion press.

This operation differs essentially from the normal hot extrusion in two important respects. First, the metal is invariably fed into the press at room temperature and there is little, if any, rise in temperature during the process. At least the temperature of the metal remains well below that of incipient recrystallization so that a hard worked structure and corresponding properties result. Second, the process is carried out at relatively high velocities and on relatively small masses of metal. The Hooker process is commercially applied to two classes of products—(1) small arms cartridge cases, and (2) small thin-walled seamless tubes.

Impact Process Outlined

The impact process, explained Dr. Crampton, is somewhat similar to the Hooker process but differs from it in some fundamental respects. Whereas in the Hooker process the metal is extruded ahead of the punch through an annular orifice between the die and punch, the flow of metal in the impact process is in the reverse direction. Here a solid bottom die is used and a flat slug of metal in place of the cup-shaped slug of the Hooker process. Here

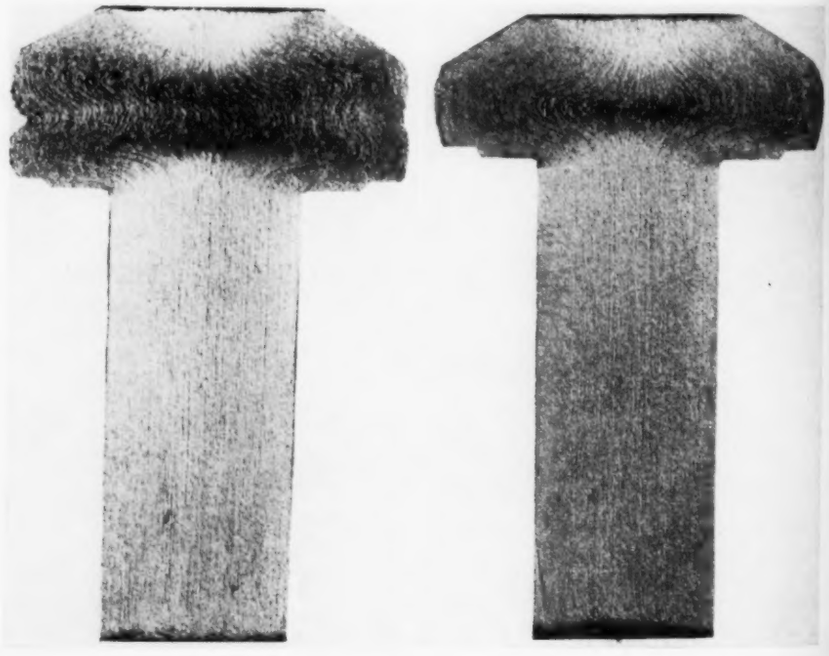

Fig. 3—Forgings sectionalized and etched to show fiber flow. (Left)—An upset in which improper die design has resulted in re-entering fibers in the head. (Right)—Upset in which proper die design has resulted in distributing fibering in the head. From paper of J. H. Friedman

LITTLE TOMMY, having taken his first step is ready for other things expeditions of discovery, healthful play, study and an education, and finally a successful career.

Industry likewise, has taken its first step upward from Depression days, but "IS INDUSTRY PREPARED FOR REAL PROSPERITY?" That is the question on every executive's tongue, and that is the manifold question to be discussed at length in the January 4, 1937, "Yearbook of Industry" issue of STEEL.

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SURFACE TREATMENT AND FINISHING OF METALS

Advances Made in Prevention of Rust On Unpainted Steel Parts in Storage

RUST protection of finished steel surfaces during storage or shipment has long caused anxiety and expense on the part of manufacturers. Cold finished steel stock, steel drums, machine tool parts, finished stock parts in factory warehouses and many others require dependable protective coatings which can be removed later.

The outstanding material for preservation of such metal surfaces heretofore has been wool fat in one or another of its various forms. In its crude state it is a reasonably good protecting material. In its purified state, as "lanolin" it is even better as a surface protecting material.

Several years ago, upon examining certain crude oxidation products made by the controlled partial oxidation of petroleum hydrocarbons, a peculiar similarity between their analyses and the analysis of wool fat (swint, degras) was noted and experiments were conducted by the Alox Corporation, Niagara Falls, N. Y., to find which of the many products that can be manufactured in this manner would have properties as good as, or possibly superior to those of wool fat.

Impetus was lent to the search by the fact that while products of almost identical general composition and equivalent molecular weights could be manufactured by the method in use, the outstanding difference between the oxidized petroleum bodies and wool fat (in fact most normal fats) lies in the fact that the petroleum products were practically entirely saturated—that is, they had no double bonds in their chemical structure. This led to a further study, and it was brought to light that most unsaturated compounds actually act as carriers of oxygen. In many cases, it is true, they oxidize comparatively slowly and then give up their oxygen to metals quite slowly, but nevertheless they do act as carriers of oxygen.

Flat steel stock stored in large warehouses is especially susceptible to rusting caused by sweating unless protected by suitable anticorrosive agents

Two Types of Compound Found

The next step was to ascertain whether or not these compounds could be used to protect metal surfaces from corrosion. Two general materials were found to have outstanding properties as anticorrosives. One material consists of fatty acids and related compounds. The other, a neutral compound, consists of unsaponifiable oxygen compounds such as alcohols, alcohol-ketones, and ketones. Both of the above types of compounds have an exceedingly complicated chemical composition and many closely related compounds exist.

Both types of material have an outstanding ability to form thin, continuous films on metal surfaces. These films, it is claimed, are entirely unaffected by cold, heat, moisture and salt spray, and, in certain cases, are highly resistant to acid fumes and the gaseous halogens (chlorine, bromine and others). Their resistance to ultraviolet light appears to be in direct proportion to the depth of color in the product as applied to metal surfaces. However, it has been found that in cities, and more particularly in warehouses where very little or no ultraviolet light penetrates, the life of films of either of these materials is very satisfactory.

Neither type of material is used alone but is formulated with certain amounts of solvent, the amount depending upon the service conditions which are to be met. As will be appreciated by those familiar with

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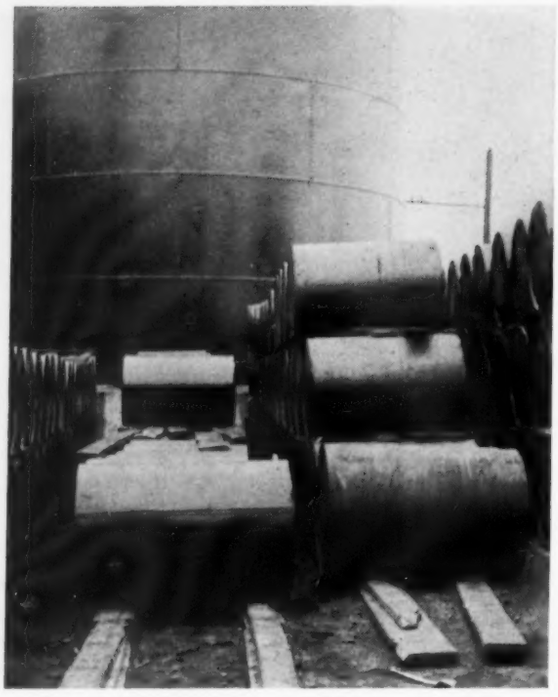


THESE steel drums were afforded full protection in an atmosphere containing hydrochloric acid gas, chlorine, salt and caustic spray by applying a neutral compound of the type described

anticorrosion problems, formulae depend almost entirely upon the metals to be protected, weathering conditions and conditions of storage. However, the maximum amount of these compounds found necessary to use was 35 to 40 per cent and the minimum amount approximately 10 per cent. They may be dissolved in Stoddard's solvent, naphtha, kerosene, or almost any of the more commonly known, less costly petroleum solvents. For use as a slushing oil they may be mixed in almost any desired quantity with oils of suitable properties. For prevention of corrosion on electrical equipment, it is suggested that approximately 20 per cent of the compound be mixed with a good grade of petrolatum.

The life and corrosion protective properties of oil base paints are effectively increased by small additions of these compounds, it is claimed.

As stated above, there are two types of compounds, one of the fatty acid type and the other a neutral, unsaponifiable alcohol type. The acidic type are not suitable for use on metals other than iron or steel, or in the presence of alkalies. However, as pointed out, they have no corrosive tendencies of themselves and have practically the same degree of effectiveness as the neutral types at a somewhat lower cost. Where the use of an acidic compound is not objectionable, therefore, attention should be paid to the worthwhile savings which may be obtained through their use.

Resists Acid Atmosphere

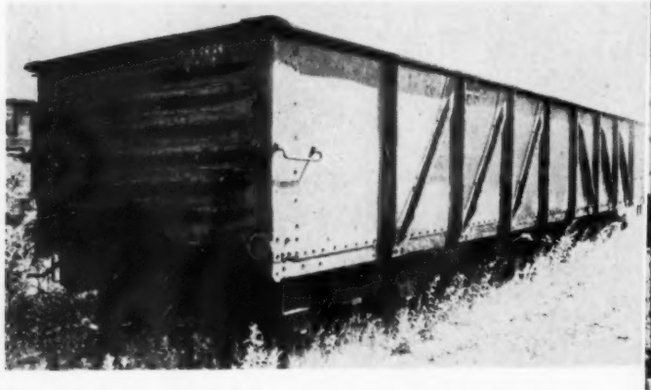
A large alkali company found the neutral compound best suited to its requirements. This company stored its empty caustic drums in the open where they were subject to an atmosphere containing hydrochloric acid gas and chlorine, as well as salt and caustic spray from the cell room. Other materials which gave even short time protection were unsuitable because of the difficulty in removing the protective coating upon shipment.

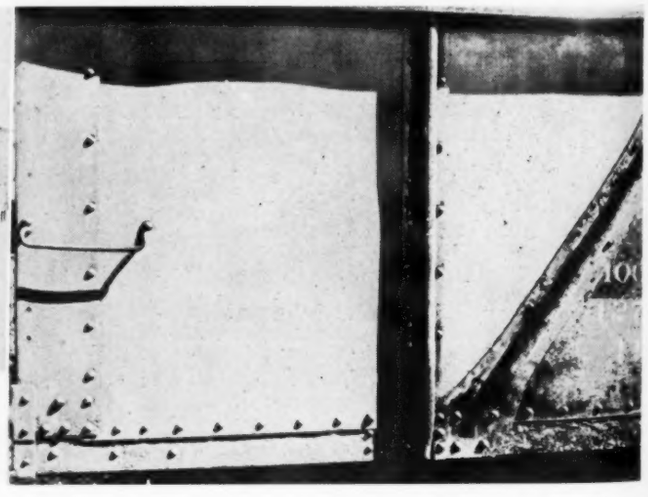
Machinery manufacturers, in fact every branch of industry which uses machinery, have metal surfaces which require temporary protection during storage or shipment. Each would be well advised to thoroughly investigate the efficacy of his particular solution of this problem and compare it with these later developments.

One interesting use of these compounds was demonstrated at the National Metal Congress and Exhibit held in Cleveland Oct. 19 to 23. One exhibitor of highly polished steel parts found that constant fingering and handling on the part of the spectators was causing his products to rust at the points of contact. This was in no way a reflec-

(*Please turn to page* 80)

Copper Paint Resists Ocean Atmosphere





TO MAKE a practical test of its new product Coppercote, American Coppercote Inc., New York, selected the badly rusted gondola car (left) lying in a railroad yard on Long Island. On April 30, 1935, the heavy scale on two end panels was chipped off after which the panels were thoroughly burned with a blow torch. Two coats of Coppercote, a paint containing a metallic copper pigment, were then applied. After 15 months exposure to the full effect of the sun's rays, to ocean fogs and winter storms, the photograph reproduced on the right was taken July 25, 1936. Note the condition of the painted surface which shows no indication of rust breaking through

POWER DRIVES

Economies in Original Cost of Drive Result in Unsatisfactory Service

In the selection of power drives entirely too much emphasis is often placed on price. Even though the machine may have cost a "pile of money" the drive is a poor place to attempt to economize. The machine cannot produce as it is expected if handicapped by drive trouble and interruptions to operation.

By close figuring on the size and rating by horsepower an apparent saving of 10 to 20 per cent may be made in first cost. If the service and load requirements are given full consideration the cheaper drive will operate for a while but not provide continuous and satisfactory operation. For example, 5 V-belts instead of 4, or a little wider chain or flat belt than planned, may increase the cost 10 to 20 per cent but life may be 50 per cent greater or even more. This increased life is sufficient to make the higher first cost cheapest in the end, without considering the freedom from trouble and probably greater production.

Dual Quotations Asked

Where it is known that price may be a deciding point representatives of one transmission organization are requested to submit two quotations. One offer is of a drive figured as closely as possible and still work for a while. The other offer is of the drive that the representative thinks should be installed.

It is explained that one drive will not be guaranteed but is offered entirely on a competitive basis against other low bidders. The other drive, however, has the backing of the manufacturer both as to life and satisfaction. The difference, it is pointed out, is due to close rating which will get by for a while and full rating for the special service requirements, uninterrupted production, long life and freedom from trouble.

When the reason for the difference in price is thoroughly explained most plant executives hesitate to buy the lower priced unit. Without the direct comparison in prices from the same source and the reason for the difference many purchasers might dismiss the quotation on the better drive as too high, without careful investigation as to the reason for the difference.

• • •

Locking Motor Starter

FOR the safety of both men and machines some provision should be made to prevent starting while service men are working on the machine or on the electrical circuits or equipment. This is especially necessary where the machine is large or is out of sight of the starting mechanism.

Such serious losses and injuries have resulted from premature starting when men were working on or in machines that some method of locking the starting equipment has been widely adopted in plants with large equipment or units covering a large area, such as conveyors. The men working are each provided with padlock and keys so that as each finishes his work he removes his lock. The starter cannot be used until all locks are off.

In small plants too great reliance is often placed on "Do Not Start" or "Men Working" signs which may be removed prematurely when the operator does not see the maintenance man, who may be in the machine or may have found it necessary to take some work back to the shop. A padlock and chain for each maintenance man is not expensive and can be applied to lock the equipment in most cases. Its presence at least indicates that the maintenance man has not "cleared" the job. No one else should have any authority to remove the lock even though the chain can be slipped off.

• • •

Lower Speed, Better Results

FOR most purposes there is a best speed. Sometimes in an attempt to obtain greater production or output speed is increased. In other instances, faulty design is responsible for incorrect speed.

On a bucket elevator drive the top drive sprocket of comparatively large diameter was driven at such a high speed that as the loaded buckets turned at the top, the material was thrown so that it scattered and much of it fell down the legs instead of going into the discharge spout. As a result the elevator choked frequently and did not deliver the required amount of material although oversize for the required output.

Decreasing the speed about one-third by changing the diameter of the pulley slowed the bucket speed so that there was practically no spillage with full and ample discharge.

• • •

Misalignment of gears resulting from the shafts crossing (with shaft centerlines extended) each other causes more trouble, noise, and wear than when the shafts have angular (with extended centerlines of shafts intersecting) misalignment. The latter causes excessive wear or breakage on the corners or ends of the teeth. Sometimes such misalignments are caused by distortion of the cause from unequal exposure to adjacent heated equipment. Improper installation also may be responsible.

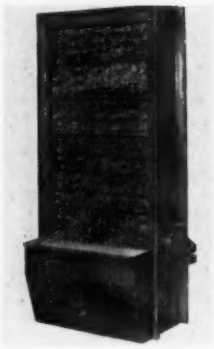
• • •

Even apparently trifling additions of weight may cause sufficient unbalanced load on gears operating at high speed to cause noise. In one case a long and heavy key in the coupling caused sufficient unbalanced load to result in extremely noisy operation.

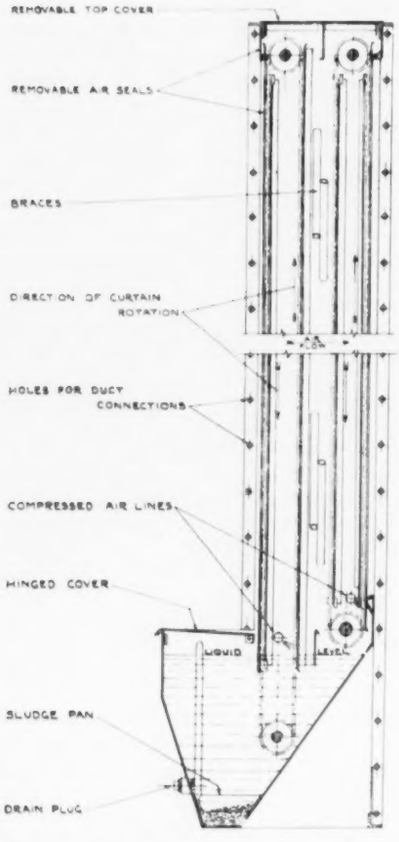
PROGRESS IN STEELMAKING

New Air Filter of Impingement Type Is Built with Revolving Curtains

CLEAN air for ventilating and air-conditioning motors and generators in steel mill power houses has been made available by an automatic impingement type filter which operates on a new principle. The filter has two revolving curtain, which has been carrying tration. Dust collected on the intake side is removed by passing through the oil bath before the curtain, which has been carrying the dust, returns to the outlet side. An oil entrainment from the first curtain moistens the second curtain, which does not pass through



Front view of air conditioning unit



Elevation of curtain type filter for conditioning air

the oil bath. The second curtain being slightly moist arrests any of the finer particles that may remain in the air stream.

Extensive tests were made to determine the most adequate filter medium. One was required that would retain oil and provide an efficient method of breaking up the air stream so that the greatest number of dust particles would be arrested. Low resistance and imperviousness to corrosion were also necessary. The most efficient medium was found to be a specially woven, copper mesh. The formation of the loops ensures a remarkable degree of oil retention and is largely responsible for the high cleaning efficiency of the filter.

Lacks Rough Projections

Freedom from matted lint is also a feature. The copper mesh is attached to smooth wire screens which have no rough projections to which the lint could cling and build up resistance. The efficiency of the medium makes the use of sharp projections unnecessary.

The filter is serviced easily from the front or rear. The panels can be removed from the curtain assembly with no other tool but a small screwdriver while the filter actually is operating, and at a convenient level to one standing before the filter. All other parts including the drive mechanism are reached easily. They can all be serviced without removing the top or parts that may be inaccessible after the filter installation is completed.

Current consumption is practically negligible. The motor is actuated by automatic controls of time-proven dependability.

All filter sections are provided with a method for cleaning by compressed air. This is in the form of a copper tube drilled with a line of holes, mounted so that when air enters the tube from the users air supply, it cleans the curtain effectively. The air supply is controlled either by an electric valve connected with the timing device, or by a manually-operated valve.

The sections are all welded and designed to fit the smallest possible space. The new unit is a product of the Staynew Filter Corp., Rochester, N. Y.

• • •

Prevents Hook Overtravel

An improved safety limit stop to prevent over hoisting accidents on overhead traveling cranes now is being marketed. When the limit stop is tripped it disconnects the motor from the power line bringing it to rest quickly with minimum drift. The device is of the main motor circuit type, handling motor currents directly without the aid of additional equipment.

• • •

Eliminates Crimped Ends

Production of cold strip has been increased by the development of a belt wrapper for tension reels. The new device eliminates the time ordinarily required for the reel to grip the strip. Crimped ends which frequently caused difficulty in stripping the coil from the reel, also are eliminated. An air cylinder moves the wrapper into place at the reel; its belt surrounds the drum with the exception of a small opening for entering the strip. After the drum makes a few revolutions, the wrapper is moved away from the reel.

HOT ROLLED COLD ROLLED SHEETS STRIP

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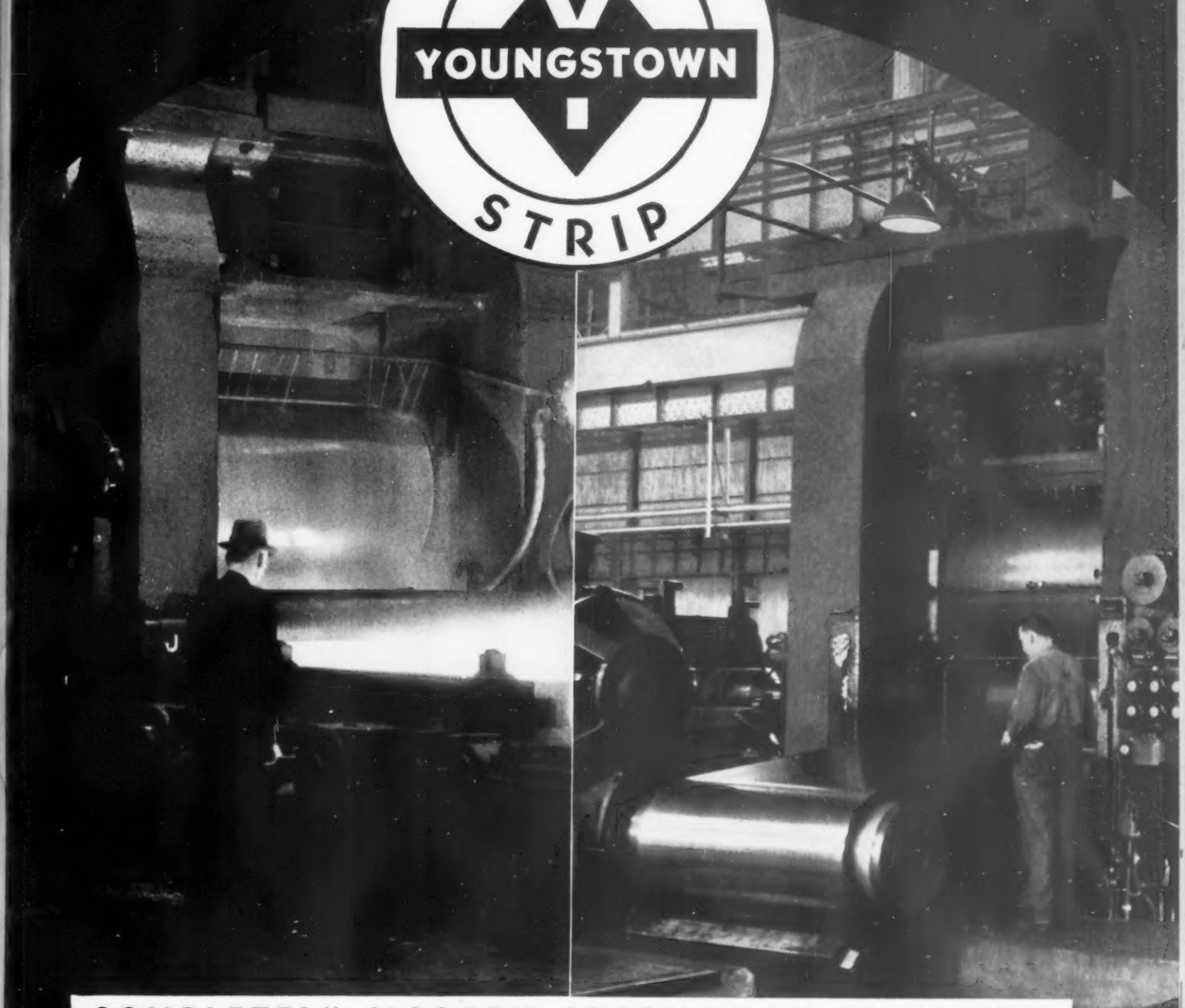

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WELDING, etc.

by Robert E. Kinkead

Education in Welding Pays Dividends to Graduates

Manufacturers who are confronted with the necessity of finding more welding operators have made inquiry about what kind of product the various welding schools are turning out. Investigation of one of the oldest independently owned and operated schools developed some interesting information.

Cleveland School of Welding, E. T. Scott, president, has been in operation about eleven years. The president, in addition to knowing the academic theories involved in welding is a master craftsman in the processes taught—gas welding, arc welding, atomic hydrogen welding, metal spray. The school is endorsed by practically all the welding interests of Cleveland.

The price of the courses varies with the conditions under which the work is done. There is nothing free about it. The average time required for one course is 170 working hours, and the school runs day and night.

At the present time inquiries for graduates far exceeds the supply. All of the school's graduates for the last ten years are working or have failed to report to the school authorities who agreed to help when the graduates need a job. On the average, the graduates are employed within two weeks throughout good times and bad times.

The Cleveland School of Welding has graduates from every state in the Union but Wyoming. Students have come from eight foreign countries including U.S.S.R., France and Brazil. About 25 per cent are sent by employers at their expense. About 50 per cent are high school graduates and 15 per cent college graduates.

• • •

Design of Arc Welders

The most perfunctory examination of any of the many sets of rules for qualifying operators will disclose the nature of the problem in welding machine design. Users have to do too much testing to find out whether Bill Jones, operator, made a good weld. The job belongs to the welding machine designer. There will be no confusion or controversy about qualification of operators when a machine is produced which will blow a whistle, ring a bell or cease operation when a bad weld is being made.

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily conicide with those of the editors of STEEL.

• • •

Welding Handbooks

Electric arc welding and gas welding equipment manufacturers issue authoritative information on welding in book form which is distributed free or at a nominal price which merely covers the cost of printing. While the books will be found in most engineering departments, the great need is to get them into the hands of welding operators.

Illiterate welding operators are a menace to everyone concerned. The man may read his Bible and newspaper, but he is a welding illiterate unless he knows how to use a good welding handbook. The information presented in the books represents the experience of thousands of operators, engineers and production men. Use of such information will prevent many wasteful and dangerous practices in the use of welding.

Several important companies have established libraries of welding literature which contain books and periodicals dealing with welding. This material is loaned on cards to anyone in the company who is interested. It does not seem particularly extravagant for a management to appropriate three or four hundred dollars to cover technical printed matter for use of perhaps 25 men whose annual payroll is $50,000 and whose knowledge and skill is built into 5 million dollars worth of the company's product.

Information on how to conduct an industrial welding library may be obtained by addressing a letter to A. E. Gibson, President, American Welding society, 33 West Thirty-ninth street, New York.

• • •

Welds of Interest

SEVERAL instances where welding has been used in the fabrication of large jobs are illustrated on the opposite page. Top left shows the stationary armature frame of a 25,000-kilowatt hydrogen cooled turbine generator under construction for the Dayton Power and Light Co. in the Schenectady, N. Y., shops of the General Electric Co.

To handle the 500-ton rotors being installed at Bonneville dam, Bethlehem Steel Co., Bethlehem, Pa., has built for the Harnischfeger Corp., Milwaukee, the all-welded rotor attachment shown at top right. The unit weighs 19 tons and measures 12½ feet in diameter.

Tank for a large oil circuit breaker is the two-eyed monster in the center. In the Philadelphia shops of General Electric the inside of this tank is being prepared for the bushings and internal mechanism.

Westinghouse Electric & Mfg. Co. has built in its East Pittsburgh shops the gas tight welded generator frame section shown at bottom left. The section is half of the frame for a 58,000-kilovolt ampere turbogenerator and weighs 20 tons.

Welded steel ventilating air housings, like the one shown at bottom right, will surround each of three waterwheel generators under construction for the Loup river development near Columbus, Neb. Allis-Chalmers Mfg. Co., Milwaukee, is the fabricator.

Technical Advances Impose Social Responsibility Upon the Engineer

(*Continued from Page 27*)

speeds are rising throughout the world and in this development the United States has achieved leadership after lagging behind other countries for several years. In this country the remarkable success of certain high speed locomotive developments of 1935 has been maintained during the current year, it was said.

Discussing general design of steam locomotives in the United States and Canada the report stated that, with one exception, the oft-predicted demand for lighter steam locomotives has found expression only in Canada. The steam locomotives placed in the United States this year have been mostly of the heaviest types. Locomotive building activity was relatively greater in many foreign countries although it also was with few exceptions confined chiefly to conventional types.

Analyzing steam locomotive and boiler accessory requirements, the report stated that the application of roller bearings to all axles, as an important step toward higher availability, is making rapid progress in this country. The resultant rigidity of the axle assembly calls for refinements in shop methods. The box-shape wheel is being used extensively in new and new-built locomotives in this country and in Canada.

Aluminum Rods Being Used

Aluminum main and side rod installations are making some progress in this country on freight locomotives. Comparison with alloy steel rods of scientific design appears to be lacking to date. Incidentally, a molybdenum content now is regarded abroad as an important factor in reducing temper brittleness of nickel and nickel chromium alloys.

The report also noted that the Commonwealth cast steel frame with integral cylinders is being used on many new locomotives. The built-up frame, on the other hand, has been improved in homogeneity and strength by cutting the side frame members out of rolled steel slabs. This method, long standard in Germany, has been adopted by the Lima Locomotive Works, Lima, O., it was said.

Diesel motive power and soft propeller cars other than diesel were discussed as to their application in various countries. The gain in diesel power is pronounced.

While passenger car orders in the United States have continued meager this year, there have been several notable developments in new equipment, particularly streamlining and the greater use of alloys, with low alloy, high-yield strength steel for car superstructures and underframes and aluminum alloys for various other parts. There is a greater tendency toward welding, which abroad rapidly is becoming standard in car construction. For instance, only welded cars have been ordered in Germany since 1935. Riveting has been specified merely for certain parts where shrinkage stresses would be objectionable. In general, it was stated, no special alloy steels are used in European car body construction for main line steam train equipment. Occasionally, however, somewhat harder silicon steels are employed.

Freight Cars Are Lighter

With respect to freight cars in this country, it was said that 1935 was particularly fruitful in new developments, incorporating designs of extraordinary lightness per unit of capacity. There has been a lull in new radical designs during 1936, while the recent ultralight designs are in test service. Orders for new equipment this year, however, have been increasing substantially.

Present trend toward the use of high tensile strength, cast alloy steel for truckside frames and bolsters of freight car trucks was discussed by Donald S. Barrows, vice president, Symington-Gould Corp., Rochester, N. Y., who gave results of static and dynamic tests made on truck members cast from alloy steel and from the Association of American Railroads' grade B steel. He stated that at this relatively early stage in the development of high tensile alloy steel frames and bolsters, it was possible in only a few cases to give test figures comparing them with frames and bolsters of grade B steel. No one manufacturer, he said, has made side frames and bolsters for the 40, 50 and 70-ton standard capacity trucks in both materials and from absolutely interchangeable patterns. Therefore some of the comparisons, of necessity, were made between grade B castings from one manufacturer and alloy steel castings from another.

Creep of metals came in for special consideration. S. H. Weaver, turbine engineering department, General Electric Co., Schenectady, N. Y., in presenting a paper entitled "The Creep Curve and Stability of Steels at Constant Stress and Temperature," defined the creep properties of steel under these conditions by the strain-hardening constant and the constant-creep rate. He described the initial creep at constant stress and temperature as a strain-hardening phenomenon with a velocity that varies inversely with time, adding that the creep extension due to this plastic flow is equal to a strain hardening constant multiplied by the logarithm of time. In the viscosity of solids, under stable conditions there would be a viscous flow at a constant rate which would produce a creep extension of constant creep rate multiplied by time. The total creep extension, he said, for a structurally stable metal at any time is equal to the sum of these two products.

Mr. Weaver stated that for steel, with a physical or structural change during creep, a third quantity must be added, with the test value of the quantity indicating the degree of instability of the test metal. The speaker presented results of long-time creep tests extending from 5500 hours to 5 years to illustrate four of the principal types of instability. They represented changes due to carbide spheroidization, ferritic banding, dendrites and alloy segregation.

Discusses Machine Design

In a paper entitled "The Interpretation of Creep Test for Machine Design," C. Richard Soderberg, manager, turbine engineering department, Westinghouse Electric & Mfg. Co., Philadelphia, presented a method of interpreting data and applied the method to several problems on machine design. The method involved a rational theory of plastic flow in polycrystalline materials to which empirical results from actual tests can be applied. The basic premise of the theory was that facts already established for plastic flow at normal temperature remain valid for higher temperatures as well.

A progress report was submitted on the activities of special research committee on the effect of temperature on metals. Five speakers presented various phases of tests; these were confined principally to 0.35 carbon steel and centered around the question of creep. The committee proposes to study creep on commonly used metals under conditions where bi-axial stresses are involved.

In a symposium on safety and hygiene in industry, Harold Miner, E. I. Du Pont de Nemours & Co., Wilmington, Del., emphasized the importance of safety contests. While not absolutely essential, a well functioning plant safety organization materially assists in the re-

duction of accidents in initiating and carrying on properly organized safety contests, a type of which he described in some detail with the aid of lantern slides. Mr. Miner said that if accidents to industrial employes are to be prevented, two fundamentals must be embodied in safety activities, namely, adequate safeguards, including both mechanical and personal equipment, and proper instruction to employes as to how to work safely, along with encouragement to do so. Prior to the last decade, he said, more emphasis was directed toward the safeguarding of mechanical equipment. This reduced injuries to a remarkable degree, but far too many accidents still can be traced to the second fundamental, lack of employe education and competent supervision.

Operating Instructions Are Needed

Emphasizing the engineering value of adequate operating instructions, D. L. Royer, Ocean Accident & Guarantee Corp., New York, outlined what he believed essential in providing these instructions. He pointed to the fact that new and improved equipment is constantly being installed and too often builders of equipment fail to provide operators with adequate information. But, he said, final responsibility for the development of these instructions and the enforcement of them is clearly that of the persons in charge of the operation of the equipment. He said the most effective operating instructions usually are produced by the owner of the equipment or his supervisors, co-operating with the designer and builder.

Motion study was stressed as an important adjunct to successful management. A. Williams, Hood Rubber Co., Boston, stated that from the standpoint of cost reduction alone its importance and efficiency could not be undervalued, but added that it provided other important benefits, notably in its relation to employe training and to personnel problems, and it was particularly in respect to this latter relationship that he addressed his remarks. In his discussion of employe training, he dealt chiefly with the socalled semi-skilled group, as he believed that it provided the greater opportunity for motion study. Mr. Williams declared that there are three important steps in employe training. The first is job analysis, the second the establishing and recording of the best method for standard factory practice and the third the actual training or teaching of the employe to do the job. He described how motion studies serve in all three steps.

Social aspects of motion study were set forth by Allen H. Morgensen, consulting engineer, New York City, who presented conclusions based in part on his own experience in conducting programs in motion study in 16 plants employing more than 30,000 workers. The primary aim of such programs, he said, is to make a better product at a lower cost and at the right time. He emphasized that this objective benefits employer, employe and the public.

Diesel Power Has Bright Future

THE fortieth anniversary of introduction of diesel power in the United States was marked by distinguished leaders in the fields of engineering, manufacturing and finance, attending a luncheon in New York, Dec. 2, in connection with the National Exposition of Power and Mechanical Engineering. Held to honor Dr. Rudolph Diesel, inventor of the engine bearing his name, the luncheon was broadcast by a National Broadcasting Co. network.

Among speakers were Gordon Rentschler, president, National City Bank of New York, chairman of the luncheon committee; Charles F. Kettering, vice president in charge of research, General Motors Corp., Detroit; Edward B. Pollister, president, Busch-Sulzer Bros. Diesel Engine Co., St. Louis; Col. Robert H. Morse, president, Fairbanks-Morse & Co., Chicago; B. C. Heacock, president, Caterpillar Tractor Co., Peoria, Ill.; C. L. Cummins, president, Cummins Engine Co., Columbus, Ind.; Edward G. Budd, president, Edward G. Budd Mfg. Co., Philadelphia; and Capt. E. V. Rickenbacker, vice president, Eastern Air Lines.

May Be Turning Point

Mr. Kettering, speaking from Detroit, observed that the present "may mark a turning point" in the history of power progress. Mr. Pollister related that according to Lloyd's reports, 325,000 gross tons more of diesel propelled vessels are being built than of all other types of tonnage taken together. Of ships from 6000 to 20,000 gross tons, the remainder of the world is now building 86 diesel ship and 24 steamships, the ratio being 78 per cent for diesel.

Following is Mr. Pollister's estimate of the marine market: "In the replacement over the next few years of about 400 obsolete American merchant ships, that is contemplated under the new federal subsidy act, it would appear conservative to estimate that one-half of the new modern ships should be fitted with diesel engines. This would require approximately 1,000,000 horsepower of diesels, valued at around $50,000,000."

In Colonel Morse's opinion, the diesel age has just started and the trend will continue for years to come. Mr. Heacock reported that his company has manufactured 1,250,000 diesel horsepower in the last five years and the 1936 production exceeds the combined total of the three previous years.

Belief that the diesel-powered passenger automobile is not far off was expressed by Mr. Cummins. Capt. Rickenbacker visualized further rapid expansion in aircraft with diesel power in the near future, while Mr. Budd asserted the belief that American diesels are superior to those of foreign make, and that they will supplement, and in many cases supplant, the present gasoline and steam motive power.

Power Show Has Many Exhibits

MORE than 300 exhibits featured the twelfth National Exposition of Power and Mechanical Engineering held at Grand Central Palace, New York, Nov. 30-Dec. 5. The entire show reflected a higher tone than in previous years, exhibits and booths were more attractively designed and presented and visitors showed unusual interest in getting at first hand information for the solution of various manufacturing and engineering problems.

Iron and steel companies were well represented and their exhibits covered the tapping of an open-hearth furnace, the operation of a miniature hot strip mill and the showing of a wide range of finished rolled steel products. Rolled copper and brass products had a prominent place in the show. Power plant machinery and many plant accessories were shown, such as a wide variety of valves, pipe and pipe fittings, power transmission equipment, air conditioning and heating units, cutting tools, speed reducers, lubricating devices, electrical apparatus, refractories, insulating materials, etc.

Control equipment and instruments had a notable place in the exposition. Lubricants were displayed prominently. Many different kinds of materials handling equipment were shown. Other exhibits included various kinds of castings, cast-iron sectional storage units, dust handling systems, bearings, pumps, compressors, presses, oxyacetylene equipment for cutting, welding and hard facing, fans, pulverizers, steam scrubbers, safety devices and many other items.

U·S·S High Tensile Steels

Transportation equipment operates faster . . . gives better service . . . costs less to run . . . shows increased earnings

HERE'S the picture —

Speedy light-weight passenger trains weighing half as much as ordinary equipment, yet just as strong. Freight cars built 20% lighter, hauling 8% more payload. Streamlined street cars that weigh 7 tons less, and speed up service, winning thousands of new regular riders. Gasoline buses 50% lighter and 40% cheaper to operate than the same capacity buses they replace. Tank trailers hauling 250 gallons more payload without increase in weight. Airplanes of stainless steel, 200 pounds lighter yet faster, safer and stronger.

This list, covering practically every phase of modern transportation, shows that it pays to get rid of useless weight — and that the *economical* way to trim off poundage is by the use of USS High Tensile Steels.

Here are the steels. The advantages they offer have been proved in hundreds of installations.

U·S·S STAINLESS Metallurgy's closest approach to the "perfect metal." Stainless Steel is more resistant to all of the destructive forces of stress, corrosion, heat and time itself, than any other commercial metal. Moreover, it is one of the strongest metals known. USS Stainless can be fabricated into light-weight beams with a strength-weight ratio as high as 10 to 1 compared to ordinary steel construction because of its high tensile strength, ranging from 85,000 to 185,000 lb. per square inch. Less weight means fewer pounds to buy — an important factor in the economy of construction.

. . .

U·S·S COR-TEN COR-TEN is the pioneer low alloy, high tensile steel. It has twice the yield point of mild steel, one-half more tensile strength, nearly double the impact resistance, and 40% added resistance to abrasion. Its resistance to atmospheric corrosion is from 4 to 6 times that of ordinary steel—which permits the use of COR-TEN's superior strength in lighter sections with assurance.

. . .

U·S·S MAN-TEN MAN-TEN has the superior yield point, tensile strength and abrasion resistance of COR-TEN and equals copper-steel in its resistance to corrosion. Its lower price per pound recommends its use where corrosion resistance and other special properties of COR-TEN are not required.

Both USS COR-TEN and USS MAN-TEN are open-hearth tonnage grades of steel whose superior properties are obtained by the addition of alloying elements in low percentages. That is why their cost is low in comparison to other types of alloy structural steels.

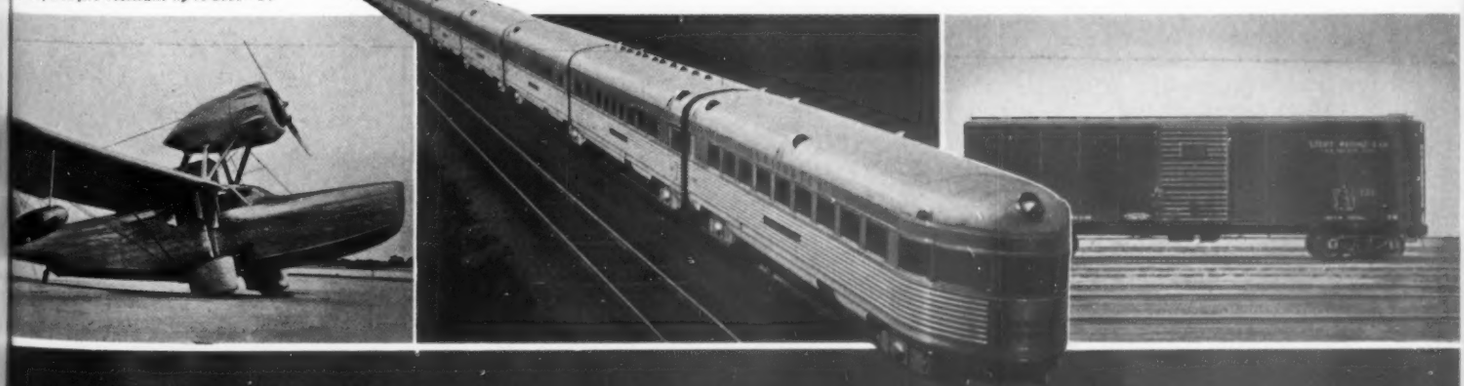
Write us. Find out how these superior steels can be applied to modernize *your* product — how little they affect shop practice or increase cost. Our engineers will gladly cooperate with you in every phase of their application from drawing board to finished job.

AMERICAN STEEL & WIRE COMPANY, *Chicago and New York* · CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago* · COLUMBIA STEEL COMPANY, *San Francisco* · NATIONAL TUBE COMPANY, *Pittsburgh* · TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham* · COLUMBIA STEEL COMPANY, *San Francisco, Pacific Coast Distributors* · UNITED STATES STEEL PRODUCTS COMPANY, *New York, Export Distributors*

0 lb. Lighter. *By using USS inless Steel for practically every part ngt motor and wing coverings this Fleet-ng "Sea Bird" Amphibian is built 200 Lighter than a similar capacity plane onventional materials. Yet it is strong-faster, safer, permanently immune to rrosion, and fire-resistant up to 2000° F.*

Breaks World's Speed Record. *On October 23, this new Denver Zephyr of the Chicago, Burlington and Quincy covered the 1017 miles between Chicago and Denver at 83.3 m.p.h. average speed. USS Stainless Steel was used in its construction to obtain maximum strength-weight ratio.*

4 Tons More Pay-load. *An experimental box car that weighs 8000 lb. less than the standard car has a USS COR-TEN body. Weight of rolled steel parts was reduced 21% by substituting USS COR-TEN for carbon steel.*



UNITED STATES STEEL

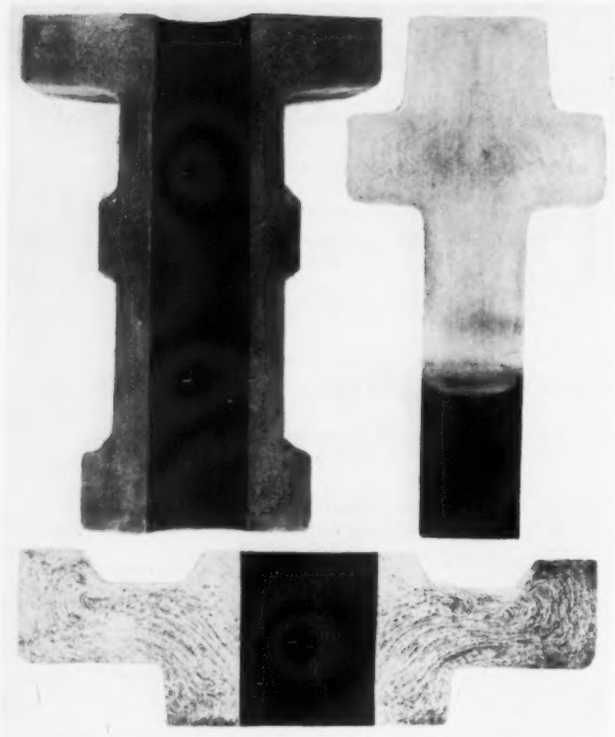


FIG. 4—Group of etched forgings which have been selected to cover jobs of widely varying types. These have been sectionalized and deep etched to show fiber flow. From paper of J. H. Friedman

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(*Continued from Page* 56)

also the punch has no shoulder and when the pressure is applied by the end of the punch to the flat slug, the metal flows back up over the punch.

In a written discussion, C. F. Hammond, metallurgist, Winchester Repeating Arms Co., New Haven, Conn., observed that Dr. Crampton made no mention of lubrication on cold extrusion by the Hooker process. This is vital to success of the process, said Mr. Hammond. For many years no lubricant other than lard oil was satisfactory and it is only within recent years that compounded oils have been used.

Lubrication Is Important

The extrusion presses are piped, he explained, so that two jets of oil are playing on the extrusion die at all times. It is the proper lubricating and cooling effect of the oils used that keeps the temperature of the extruded article below recrystallization temperature. For later fabrication and final use it is essential in practically all articles which Winchester manufactures by the process that the inherent stiffness and hardness from the cold extrusion be retained. Importance of lubrication is therefore apparent.

Cold heading has been defined as the process of forming by pressure the heads of bolts, rivets, nails, etc., on the ends of suitable lengths of wire at or near room temperature. Today, said Roy H. Smith, vice president, Lamson & Sessions Co., Kent, O., this definition covers only a small portion of the cold-heading field, as there are many articles being produced which bear little or no resemblance to bolts or rivets, as frequently the upset or forming is not done on the end of the wire.

Increasing demand for smoother shanks on bolts, more accurately maintained and free from scale, brought into existence the cold-heading industry. The fact that many of the commercial metals and alloys, as now made, are malleable at or near room temperature and are capable of being plastically deformed, has brought about the development of the industry to its present state.

Must Improve Materials

In some phases of the industry, asserted Major Smith, the limit of malleability of the raw material has been reached and any future development will depend upon our ability to produce materials possessing greater malleability. As knowledge of the effects of impurities on the physical properties of metals is increased and methods of controlling these impurities develop, such raw materials may reasonably be expected. It will be necessary also to improve the physical condition of the raw materials with respect to surface conditions, such as seams, laps, etc.

In other phases of the cold-heading industry, equipment and tools have been the limiting factor. Requirements of mass production industries for higher strength material, smaller tolerances and finer finishes have necessitated development of larger and more rigid heading machines. These difficulties have been overcome to a considerable extent by the combined ef-

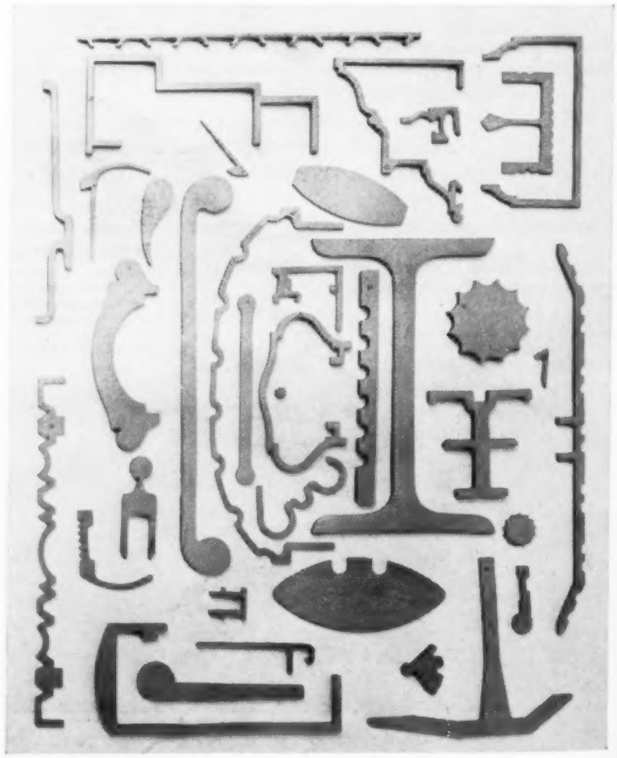
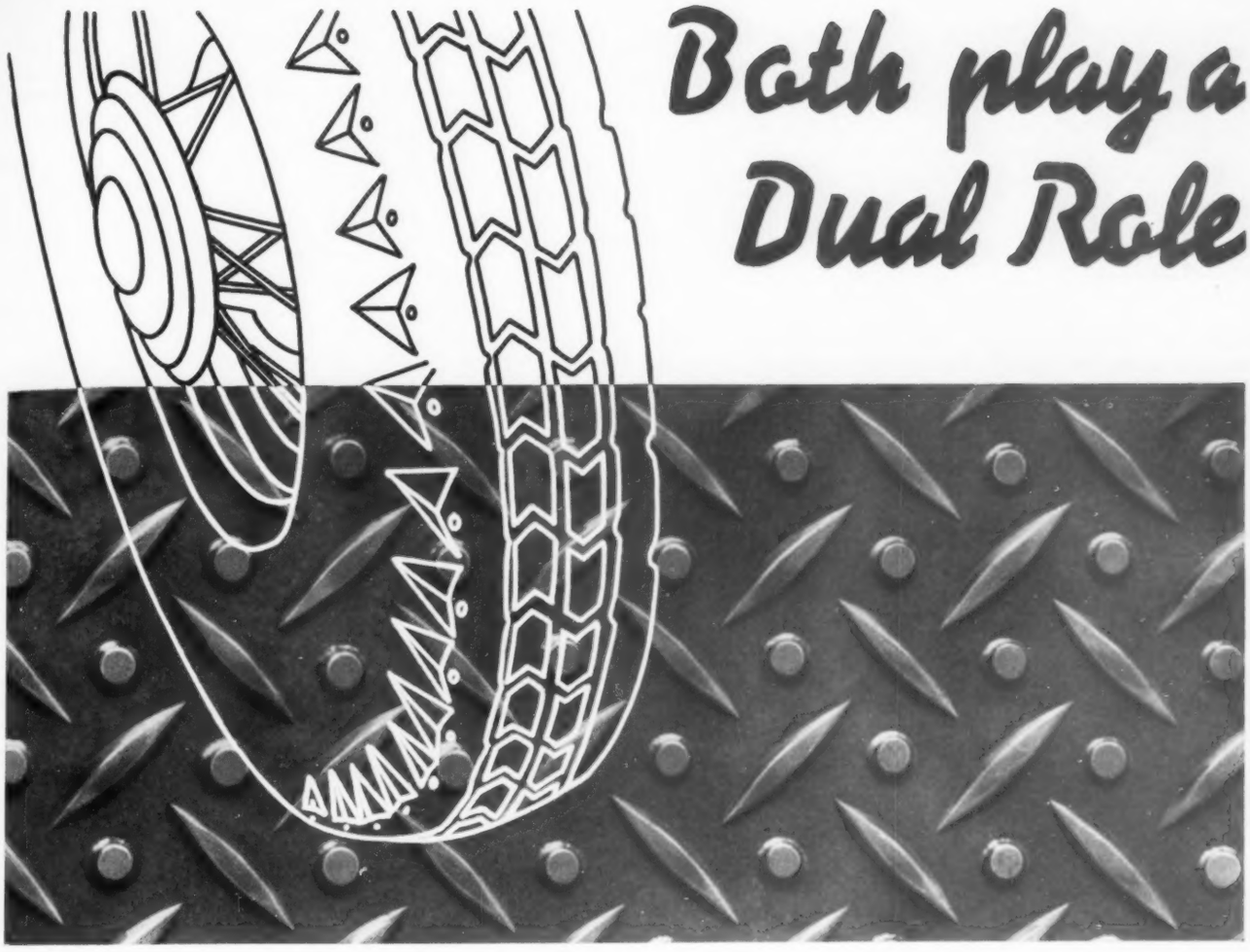


FIG. 5 — Here are shown some of the many different and intricate sections that can be extruded in copper alloys. From paper of D. K. Crampton



Both play a Dual Role

THE long wearing qualities and the safety features that form an integral feature of the modern tire's design, is fittingly comparable to the properties that contribute to CENTRAL's popular "ALL-WAY GRIP" Rolled Steel Floor Plate . . . *both play a dual role.*

The pattern of CENTRAL'S "ALL-WAY-GRIP" provides a distinctive balance of perfect symmetry. Its *all-directional design* permits maximum economy and minimum wastage in shearing . . . each diamond projection centering the next one at right angles . . . back of it all—CENTRAL's 83 years of specialization.

May we mail you a copy of a complete little booklet which we have prepared—both illustrating and describing CENTRAL FLOOR PLATES in detail? Included are forms, sizes and necessary installation data. Write today!

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QUALITY
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Forging Billets — Slabs

Sheared and Universal Plates

"CENTRALLOY"
High Tensile Steel

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ROLLED STEEL FLOOR PLATES
"Knobby" "All-way-grip"
"Knobbyette"

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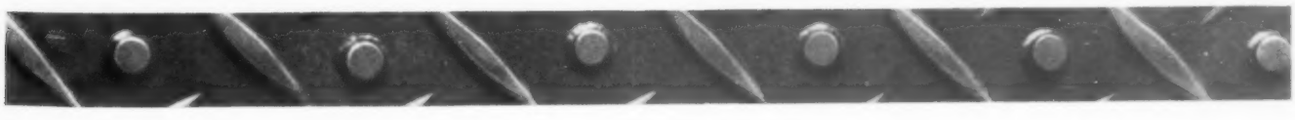


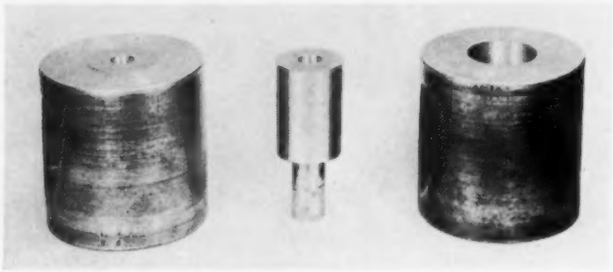


FIG. 6—Here is shown a composite or so-called insert die. From paper of Roy H. Smith

forts of tool steel manufacturers and die designers, so that today the limits of the cold heading process are more economic than mechanical.

Solution of the heading tool problem, the author continued, has involved the substitution of high alloy steels for the 1 per cent carbon tool steel used for so many years. This substitution in turn has made necessary many changes in die design. Present trend is toward composite or so-called "insert" dies, such as is shown in Fig. 6. In recent years several processes and machines have been developed which make possible the collecting of greater amounts of stock in the head section. In the Kaufman single extrusion process, wire of nominal diameter is pushed into the solid heading die and reduced to pitch diameter for the thread section. The head is then upset in the usual manner. By using wire of nominal size instead of pitch size, a considerable large volume of stock may be upset, or for a given head size, less plastic flow of the metal is produced.

Equipment Extends Range

With development of the single extrusion process, the single-die, double-stroke header seems to have reached its limit as regards amount of stock upset, Major Smith continued. Improvements in squareness and smoothness of cut-off and maintenance of alignment of the heading tools cannot be large. However, a new type header is available which does extend the range of cold heading. This type, known as the Boltmaker, is of the multi-die, single-stroke type.

One of the most recent developments in cold heading is the so-called scrapless nut process, which involves the cold upsetting of a nut blank from round wire or rod. A blank is sheared from a coil of wire and in successive stations is formed into a hexagonal or square nut blank, as shown in Fig. 7. In the final station, the blank is pierced so that it falls from the machine ready for tapping. The only material lost in this process is a slug having a diameter equal to the hole diameter and a thickness approximately one-half that of the finished nut. This scrapless nut machine is in reality a multi-die, single-stroke header of the solid die type. Its success is due to the fact that tool steels are now being produced which will withstand the tremendous pressure necessary for these forming operations.

In conclusion, Major Smith observed that the present trend in cold heading is toward more and more difficult and unusual types of product. Fig. 8, for example, shows a part requiring an upset in more than one place. Those products requiring higher and higher unit pressures in the die will probably furnish the most interesting developments in the immediate future. Extrusion in combination with upsetting and pressing, and possibly with some slight deviation in temperature, will play a major part.

General aspects of cold drawing rods and bars in the so-called plain carbon steel grades were discussed in a paper by J. E. Beck, metallurgical engineer, Jones & Laughlin Steel Corp., Pittsburgh. Considerable time was devoted a description of the cold drawing process. Up to 0.50 per cent carbon, all of the widely-used plain-carbon grades are cold drawn commercially. The most popular grades are S.A.E. steels 1112, X-1112, 1020, X-1020, 1035, 1940, 1045, 1120, X-1314, X-1315, 1335 and X-1335. Many users do not identify their steel grades by S.A.E. designation, however, regardless of the method of identification, the grades listed, allowing for slight chemical preferences, are representative of the most popular commercial grades.

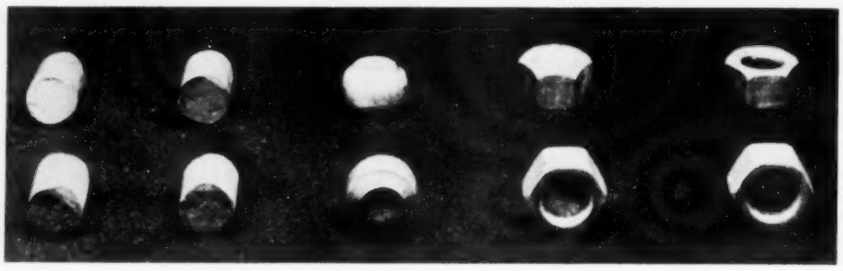


Fig. 7—The sequence of operations in making a nut in a scrapless nut machine are shown in this illustration. From paper of Roy H. Smith

Outlines Drawing Practice

There are those who suspect that hot-rolled stock is annealed or normalized preparatory to cold drawing. As a matter of regular procedure, such is not the case although if specified by a purchaser or necessary because of the nature of the required properties, annealing or normalizing, is employed. However, in carbon steels over 0.50 per cent carbon, it has been found desirable, in fact almost necessary, to anneal the hot stock before cold drawing. Further in these higher carbon steels, the ductility of the cold-drawn product is considerably more desirable in the annealed and cold-drawn state.

Within the last few years, according to Mr. Beck, some advantage is realized in special instances by low-temperature treatments after cold

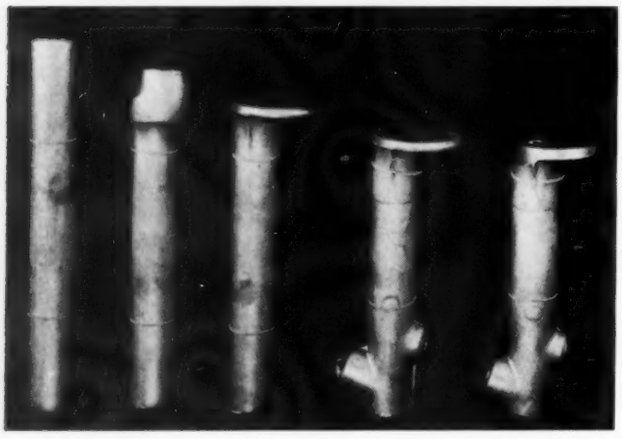
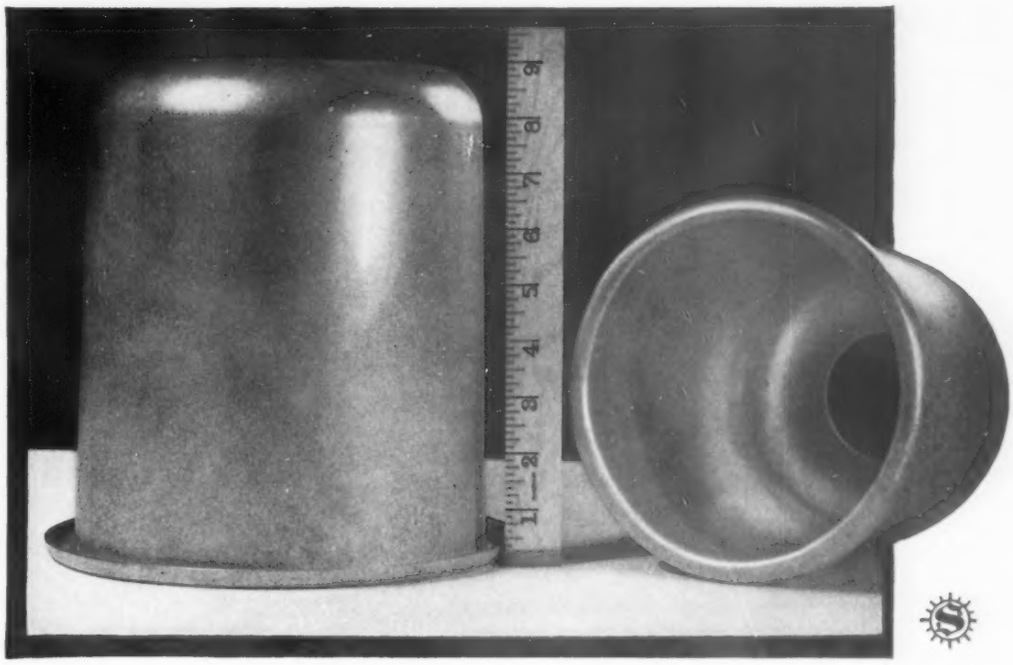


FIG. 8—Shown here are the steps in making a brake shaft housing wherein the piece is upset in more than one place. From paper of Roy H. Smith



Yours for deep draws!

The exceptional drawing quality of Seymour Nickel Silver, and its silvery white color, are constantly finding new places for it in advanced product design.

For the same reason, it is proving to be a superior alloy for the cupping of parts of utensils, appliances, etc., which were formerly at the mercy of less workable alloys.

The larger of the examples above (shells for glass rinsers) is a 10-inch draw. These shells were not selected for display purposes. They truthfully represent the high average of ductility of Seymour Nickel Silver—a product of more than forty years of specialization.

This attainment is not due to any "trade secret." It is the sum of many refinements all along the line of manufacture from casting to final inspection—the mixing of years of experience with crucibles of metal!

Not by guess but by *vigilance* is the Seymour quality level maintained. A rigorous checking system is a permanent institution in the Seymour plant. Each heat is analyzed and given a heat number. Tests are then made at every important stage of manufacture. If at any time a sample falls short of the requirements set for it, that batch is located by its number and promptly withdrawn. This involves detail and expense, but it has paid us because it has paid our customers.

May we send you, without obligation, samples of Seymour Nickel Silver for test purposes?

REMEMBER THE NAME—

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NICKEL SILVER

THE SEYMOUR MANUFACTURING CO., 51 FRANKLIN ST., SEYMOUR, CONN.
SPECIALISTS IN NICKEL SILVER AND PHOSPHOR BRONZE

drawing. Such treatments may involve temperatures ranging from 300 to 1100 degrees Fahr., depending upon the results sought. In some instances, "strain drawing" at temperatures in the neighborhood of 400 to 700 degrees Fahr. is employed as an "accelerated aging" function. On the other hand, "tempering" effects with improved ductility without appreciable losses in tensile and yield values are produced through use of temperatures between 700 and 1000 degrees Fahr. However, it should be understood that heat treatment, either before or after cold drawing, is not regular procedure, but could be classified, except in the case of higher carbons, as special procedure to meet special requirements.

Some believe that the metallographist can identify cold-drawn material from hot rolled with the microscope through identification of elongated grains in a longitudinal section. As a general thing, said Mr. Beck, this is not so. Even in sizes as small as ½-inch diameter, the amount of draft employed is not sufficient to cause enough structure distortion to be apparent under ordinary microscopic magnification.

It is true that in carbon steels over 0.50 per cent carbon under some conditions slight indications of grain elongation may be detected to a shallow depth, but, as stated before, in general such grain distortion as might have been effected in cold drawing is so small as to be practically negligible. This is not true in some wire drawing where the drastic cold reductions employed do leave their mark on the wire structure.

Die Removes No Metal

Some people suspect that the skin of the bar is removed in some manner when drawn through the die. Obviously this is not true. No metal is removed, other than the scale in pickling, during the entire process. The hot-rolled bar actually is stretched through the die. For example, a 1 1/16-inch round 33 feet long will elongate about 3 feet when cold drawn to a 1-inch round, thereby giving a cold-drawn length of slightly over 36 feet. Fig. 9 shows a sketch of two types of cold drawing dies and some idea of the drawing action.

Uses of cold-drawn steels have become so wide that their applications are too numerous to cover completely. Some of the uses are for spark plug shells; radio speaker cores; bolts; nuts; screws; gears; pinions; cash register parts; chain pins and typewriter, sewing machine and rolls for silent chains, motor and transmission shafts; motorcycle crank axles; oil pump shafts and gears; piston pins; steering gear arms; bushings; pins and worms; tie rods; wringer rolls; gun parts; etc. Industries manufacturing automobiles, motorcycles, bicycles, sewing machines, typewriters, adding and calculating machines, textile machinery, shoe machinery, electric refrigerators, railroad equipment, agricultural implements and electrical equipment are large consumers.

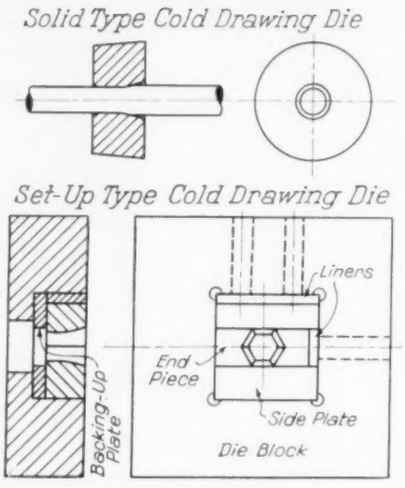

Fig. 9—Sketch showing types of cold drawing dies. From paper of J. E. Beck

In conclusion, Mr. Beck stated that a better and more complete appreciation of the characteristics of cold-drawn material should enlarge its field of application. It is the aim of the steel manufacturer, through exhaustive studies of manufacturing practices, to develop definite processing procedure to produce specific properties. Considerable progress has already been made in this connection and with the passing of time it is only reasonable to expect a more complete and precise understanding which will prove mutually advantageous to both consumer and producer.

Recommendation in Print On Abrasive Grain Sizes

Division of simplified practice of the national bureau of standards, Washington, has announced that printed copies of Simplified Practice Recommendation R118-36 on Abrasive Grain Sizes are now available from the superintendent of documents, government printing office, Washington. The recommendation establishes a table of allowable limits for the sizing of aluminum oxide and silicon carbide abrasives for polishing use and grinding wheel manufacture. This revision does not change the recommended sizes established Sept. 1, 1930, but clarifies the headings and the example which is given to explain the use of the recommendation. The recommendation is subject to regular review by a standing committee of the industry.

No Difficulty Encountered In Pouring Frozen Molds

In certain sections of the country where the cold is intense in the winter, foundry molds occasionally are frozen when they are left on the floor over night. Confronted with this experience for the first time, a foundryman may have doubts of the advisability of filling the mold with molten metal. He need not hesitate. Experience has shown that if the mold is in proper condition for the reception of metal, before it is frozen, it will receive the metal in an equally satisfactory manner after it is frozen.

Effects of Phosphorus on Cast Iron Given in Booklet

Entitled *Phosphorus*, a booklet consisting of four papers recently has been published by Sloss-Sheffield Steel & Iron Co., Birmingham, Ala. In order of appearance, the papers are: Six Years' Progress in the Metallurgy of Phosphorus in Cast Iron, by Rebecca Hall Smith, foundry consultant, Detroit; Treattise on Phosphorus in Foundry Pig Iron, by the late Y. A. Dyer, consulting metallurgist, Birmingham, Ala.; The Carbon Equivalent in Gray Iron Control, by Dr. J. T. Mackenzie, metallurgist, Birmingham, Ala.; and a castings analyses guide prepared by F. E. Fisher, metallurgist, Chicago.

Advances in Anticorrosives For Unpainted Steel Parts

(*Concluded from Page 62*)

tion upon his product because the salts and acids in the perspiration deposited upon the clean surfaces were unhindered in their corrosive action. Nevertheless, the unsightly marks which were appearing on his products were becoming a distinct hindrance to sales. Quite by chance he discovered an exhibit of these compounds and among them found a greaseless type which deposited an invisible film on polished surfaces. This film in no way interfered with the brightness of the polish and the fingers of those who handled the products did not become greasy. Yet full protection was afforded his products and one application sufficed for the duration of the exhibit. This type of material should find wide use among exhibitors of polished products and many new fields of application as well.

MATERIALS HANDLING

Eliminates Hernia Hazard

(*Concluded from Page* 52)

unloading the tin plate and carrying it to the storage space. This type of truck also is used for transporting materials from one operation to another, as for example as shown in one of the illustrations.

At the storage space, the tin plate is tiered by means of a high stacker, hand-operated. This same stacker also is used to take the units of tin plate down from the storage piles and over to the slitters and other machines where the plate is to be used.

At these machines, the skid load is placed on another stacker, or portable elevator, one of which is stationed alongside each machine, as shown in another illustration. There are 12 of the latter type of stacker in the LeComte factory. They serve to keep the sheets of tin at the most convenient height for the operators, who with a slight motion of the handle can raise the load as the pile of plate diminishes. This prevents bending and like fatigue, and conserves the operator's strength.

From the slitters, the tin is trucked on skids or in skid boxes to the presses and other forming machines, final operations bringing the finished cans to the opposite side of the factory from the receiving room, and at this point, directly opposite the receiving door, is access to a truck loading dock, alongside of which runs another switch track, convenient for carload shipments.

From the first operation to the last, there is one noticeable principle of handling in evidence—everything possible is kept "off the floor." Another equally evident practice is ""keeping goods on the move." Orders of the day usually start through at one side of the plant and flow out in the form of finished cans at the other. Insofar as possible a minimum of floor space is occupied by finished products.

• • •

Coal Storage Handling

INTERNATIONAL HARVESTER CO. employs a tractor to utilize coal storage space at its South Chicago steel mill more efficiently. At this particular plant most of the coal is used for coke-making. It arrives by ship and is unloaded by an 11-ton clamshell bucket operating from a traveling bridge crane. The dock is approximately 900 feet long and 155 feet wide. During the navigation season, two or more ships are unloaded each week, the delivery averaging 20,000 tons. It is necessary to store sufficient coal to last from Dec. 1 to the time in May when the first shipload of new coal arrives.

The company now uses a diesel-powered tractor equipped with a bulldozer, and drives this machine back and forth over the top of the coal pile, leveling it and compacting it to a density of 60 pounds per cubic foot. Preliminary estimates of the gain in storage space from this method of coal handling indicates that the increase is between 15 and 30 per cent.

TROLLEY CONVEYOR HANDBOOK
Just off the Press
This new 94 page engineers' handbook on power driven overhead Trolley Conveyors, with 250 illustrations, is the most comprehensive work thus far published on this subject—and it is right up-to-date.
Some of the subjects covered are:
Design and Layout • Proper Selection of Chains • Trolleys and Wheels • Track • Standard Drive Units • Sprockets and Shear Devices • Take-Ups • Roller Turns • Traction Wheels • Automatic Oilers • Hooks and Carriers • Guards and Housings • Automatic Transfer of Loads from One Conveyor to Another • Special Equipment • Monorail Systems.
Mechanical Handling Systems Inc.
4600 NANCY AVE. • DETROIT, MICH., U. S. A.
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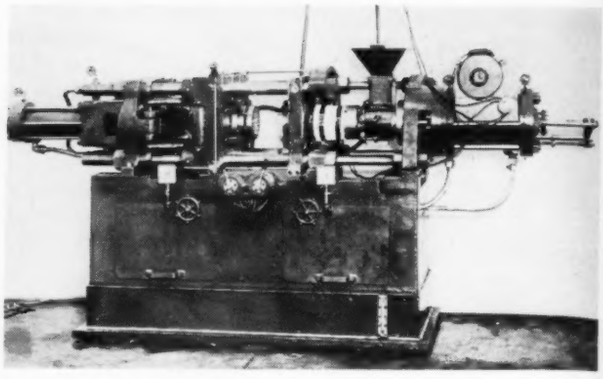
ON YOUR OWN LETTERHEAD
FOR YOUR COPY

NEW EQUIPMENT

Molding Machine—

Reed-Prentice Corp., Worcester, Mass., is the maker of a new full hydraulic plastic injection molding machine, which delivers up to 400 shots per hour, molding 500 cubic inches per hour. Maximum pressure per square inch on material is 20,000 pounds. Standard equipment includes a 1000-pound Vickers hydraulic pump with valve control and electric heating unit including rheostat control for heating material. Arrangement can be made on the heating unit for using thermometer or thermocouple, and an automatic counter can be supplied if desired. Machines are furnished for either manual or automatic operation. On the automatic machine two timing units are furnished. One is for the period for the material to solidify, the other for regulating the time molds open for ejection of castings. These units may be adjusted from zero to 32 seconds. Other features of construction include positive toggle mechanism rigidly locking the molds mechanically and not depending on hydraulic pressure to hold molds closed. Hydraulic pressure is used to open and close molds only and to operate plunger cylinder. Machine is operated by a pump driven by a 5-horsepower motor. Base of the machine acts as the reservoir for the hydraulic system, making the machine self-contained.

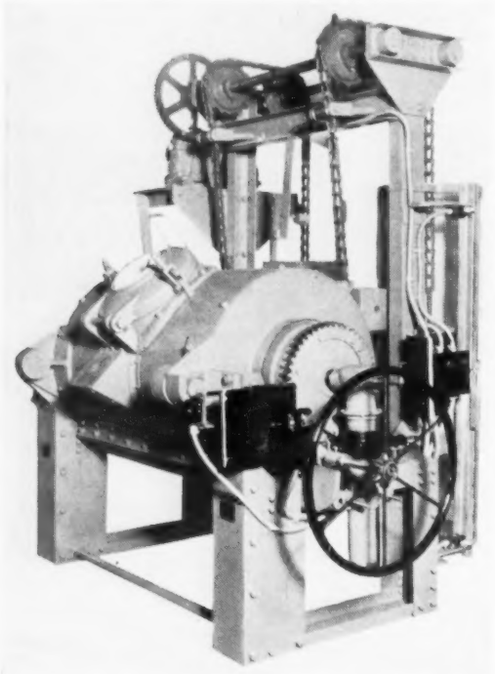


Reed-Prentice full hydraulic plastic injection molding machine

♦ ♦ ♦

Furnaces—

Monarch Engineering & Mfg. Co., Curtis Bay, Baltimore, is the maker of a new line of Simplex furnaces with stationary lip, designed for pouring directly into molds. These furnaces are of the non-crucible type, bottom pour, using brick or rammed-in linings. Built for oil or gas fuel, capacities range from 300 pounds to 10 tons per melt. Illustrated here is the size 93, a bottom pour model of 1200 pounds copper capacity per melt. The furnace lifts from cradle to pour by means of double chains which are counterweighted. Electric motor, pushbutton controlled, drives the apparatus, while the furnace is rotatable in the cradle by means of a hand operated control.

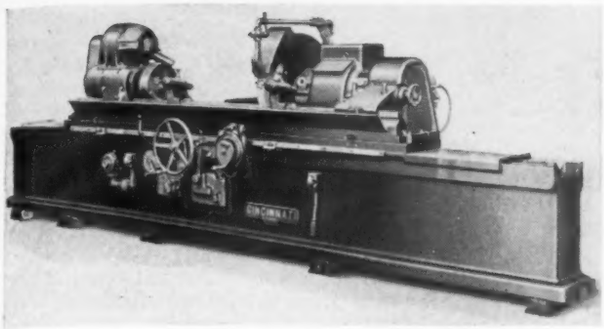


Monarch Simplex furnace with stationary lip for pouring directly into molds

♦ ♦ ♦

Grinding Machines—

Cincinnati Milling Machine and Cincinnati Grinders, Cincinnati, has recently announced a new series of 14 and 16-inch plain self-contained cylindrical grinding machines, built



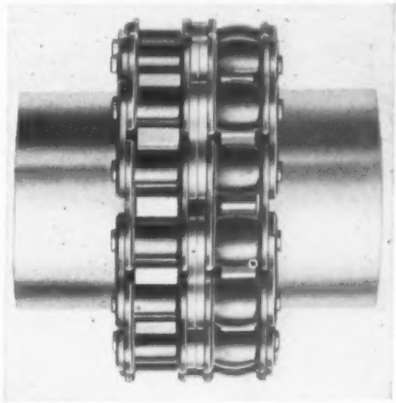
Cincinnati plain self-contained cylindrical grinding machine

in standard between-center lengths ranging from 18 inches to 168 inches. Spindle radial bearings are load compensating, operating effectively on light or heavy cuts without adjustment. A plain thrust bearing supported by a cradle type mounting, is located midway between the ends of the spindle. Lubrication of the bearings is entirely automatic. Oil is filtered before it enters the bearing space and a pressure starting switch controls the main motor, preventing operation until there is lubrication pressure in the bearings. Main motors greater than 20 horsepower are mounted on the floor, smaller motors on the top of the unit. Headstock is independently driven by a direct current motor mounted on top of the casting. Power is transmitted by V-belts and silent chain to the jack-shaft and face plate. Twenty-four work speeds, ranging from 40 to 160 revolutions per minute are available on the 14-inch grinder, and 25 to 100 revolutions on the 16-inch model. Controls are grouped in front of the base for ready accessibility. Driving power for the table is derived from a separate motor, which also drives the coolant pump. The switch controlling the main motor also controls this drive. In case direct current is not available for the headstock motor, provision is made for a motor generator to supply the power.

♦ ♦ ♦

Flexible Coupling—

Baldwin-Duckworth Chain Corp., Springfield, Mass., recently introduced a new line of flexible roller chain couplings. Extra clearance between chain and sprockets to allow flexibility is eliminated. Instead, flexibility is secured through the design of the coupling itself, and there consequently is no looseness to promote wear and decrease life, it is claimed. While periodic lubrication is advisable, it is not necessary to provide an oil bath for these couplings. Hence an oil-tight casing is not necessary. The new series includes a coupling for every condition of angular or radial misalignment. One design, known as the Semi-Flex, is for slight angular misalignment and shaft end play. Another, the Flexible, is for greater angular misalignment and slight radial misalignment. The Twin-Flex coupling is for extreme angular misalignment and



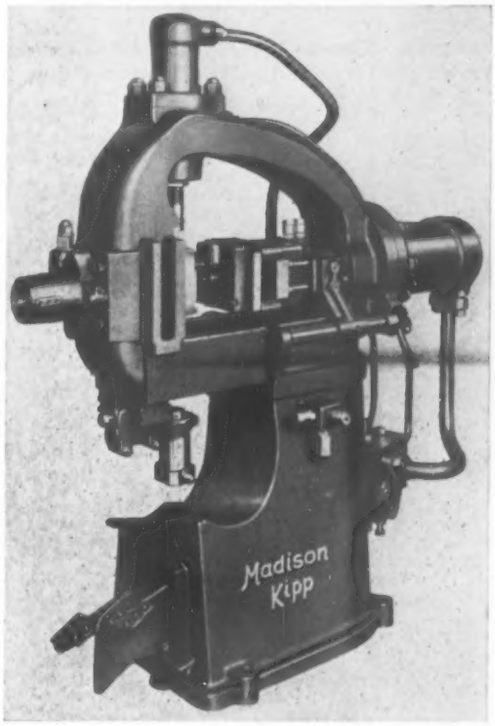
Baldwin-Duckworth coupling, Flexible model, uses convex-roller chains in its design

greater radial misalignment. The compound coupling and dummy shaft coupling are for extraordinary misalignment conditions, either angular or radial. These roller chain couplings, made entirely of steel, will withstand any atmospheric or general working conditions that the shaft on which they are mounted will stand, without loss of flexibility or efficiency, according to the company.

♦ ♦ ♦

Die Casting Machine—

Madison-Kipp Corp., Madison, Wis., has just announced new equipment for casting brass and rigid analysis aluminum by the high pressure method of casting metals in the plastic state. The new list of products includes three machines, five sizes of hydraulic pumping units and a new design for electric holding furnaces. Machines are based on the patents of Josef Polak, leading European exponent of the high pressure die casting system, now available for the first time in this country. An unusual feature of the new machines is that the casting metal well is provided in each die. This well is made the proper size for the forcing plunger of the machine, having only a small amount of clearance for ease of operation. Provision is made in the machine so that the casting may be ejected from either the moving or stationary side of the die. In the machine illustrated, line pressures up to 2500 pounds providing a die holding pressure of 30,000 pounds and 7700 pounds for the standard diameter metal forcing plunger are provided. Higher plunger pressures are available, and speed of the plun-



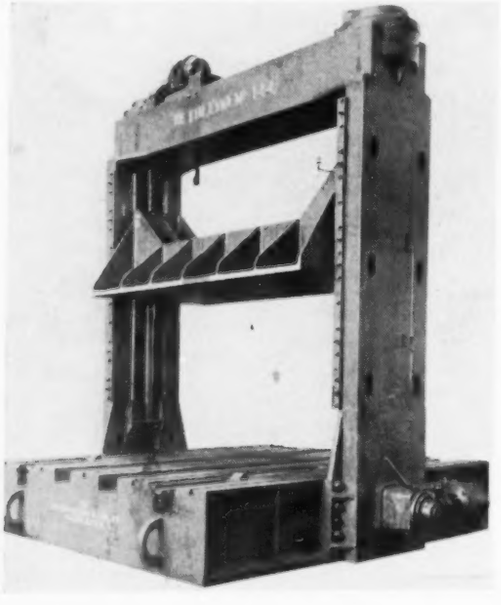
Madison-Kipp brass die casting machine using high pressure method of casting metals in plastic state

ger may be varied to suit the casting conditions of the various metals to be used. In the larger machines metal forcing pressures may exceed 20,000 pounds per square inch. Metal is held in the plastic state in the newly designed furnace. Machines may be equipped with hydraulic core pulling mechanism to actuate cores from either side of the machine or at the bottom of the die. Mechanical core pulling devices and automatic ejector mechanisms may be applied to these new machines. Machine illustrated on page 85 is model 256. It is fully hydraulic in operation, as are all machines in the new series.

♦ ♦ ♦

Die Spotting Press—

Toledo Machine & Tool Co., Toledo, O., division of E. W. Bliss Co., is announcing a new and improved die spotting press. It is used for the final fitting or spotting the shaped surface of large drawing and forming dies. The press is arranged for individual direct connected motor drive, the motor being a reversible variable speed and high torque type. The slide is well gibbed for alignment and has drilled holes for attaching the dies. The bed has an area of 160 x 140 inches and five T-slots for clamping. There are two screw operated pushers driven by an electric motor through a clutch that allows the pushers to be reversed. Limit switches stop the slide travel at extreme top and bottom. The press has ball bearings throughout, the gear boxes are all self lubricating and the screws are covered with a telescoping cover to protect them from dirt and grit. These presses can be furnished with the planer type table if desired. In case more pressure is needed these presses are furnished with hydraulic operating cylinders in place of the screws.



Toledo die spotting press used for the final fitting or spotting the shaped surface of large drawing and forming dies

♦ ♦ ♦

Electric-Hydraulic Riveter—

Hanna Engineering Works, 1765 Elston avenue, Chicago, announces a new electric-hydraulic riveter. Power unit is a combination of a motor driven primary pump, a valve mechanism and an intensifier, the fluid power developed being transmitted to the riveter by flexible high pressure hoses. Control of the riveter by the operator is done by means of a trigger switch. Depressing the switch operates a solenoid-actuated valve permitting the fluid under primary pressure to force the ram to preform the rivet to the extent of the primary pressure. When the ram has preformed the rivet, intensifier automatically boosts the pressure in order to finish the rivet. After maximum pressure has been exerted, ram automatically returns to the starting position. Releasing the trigger switch at any time will reverse the ram movement, and depression of the switch at any point will change the return ram movement to a driving stroke. Low voltage transformer operates the trigger switch circuit for the protection of the operator, and overload relays protect the motor. Unit here illustrated exerts 20 tons on the dies and is capable of driving ⅜-inch rivets cold. Other models are available both portable and stationary for driving rivets up to 1⅛ inches hot.

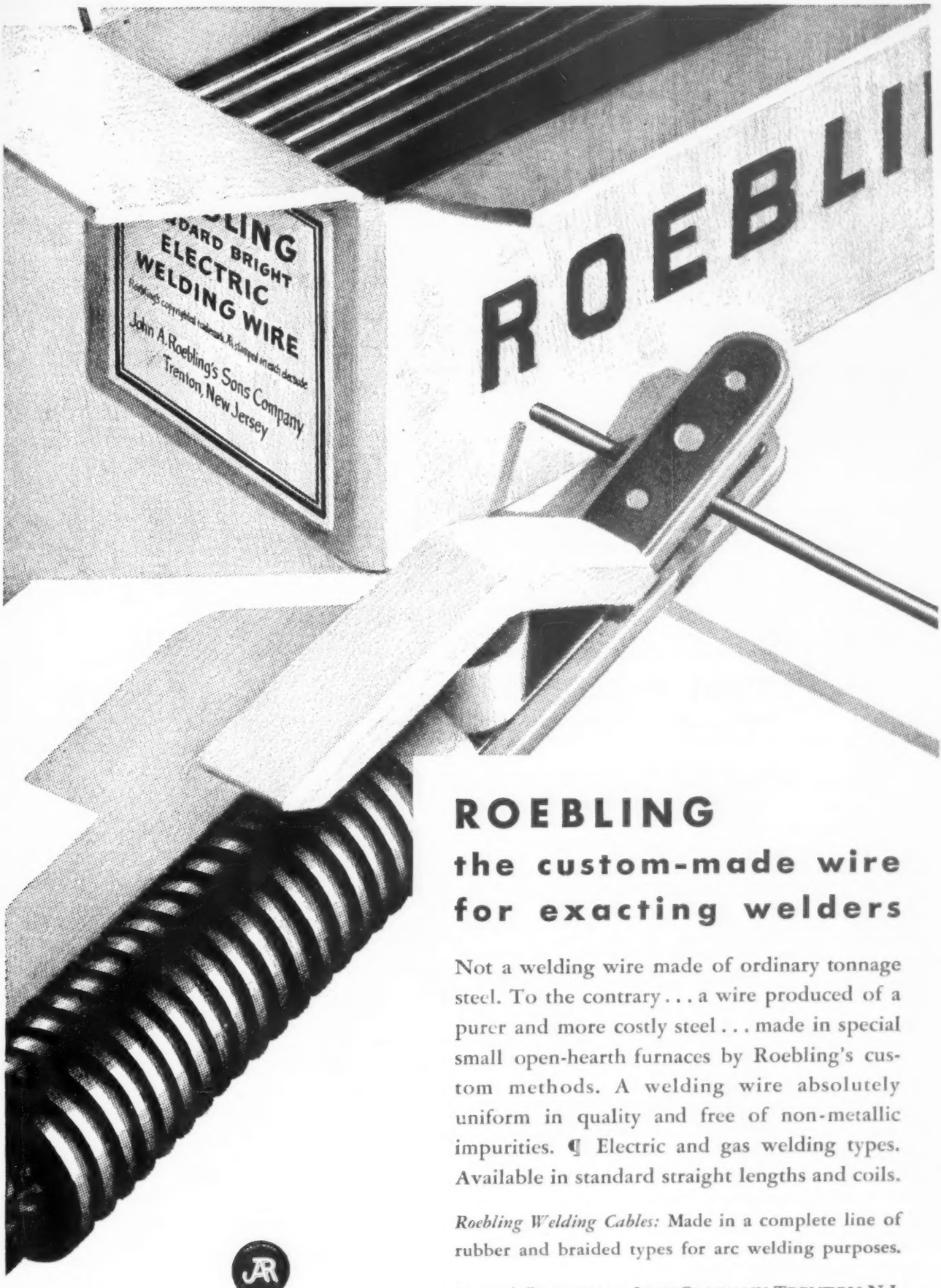
Hanna electric-hydraulic riveter furnished in portable and stationary models

♦ ♦ ♦

Grinder—

Jas. Clark, Jr., Electric Co., 600 East Bergman street, Louisville, Ky., announces a new 2-horsepower grinder equipped with pushbutton control and overload protection. Enclosed safety guards, adjustable for wheel wear, and non-shatterable glass eye shields are among the safety features. Tool rest is adjustable both horizontally and vertically, and an exhaust opening in the bottom of the wheel guards is an optional feature. Wheels are 12 x 2 inches with a 1-inch hole. Motor is enclosed and rated 2 horsepower for continuous duty at 1750 revolutions per minute with a 55-degree Cent. rise. Rotor shaft is mounted in heavy duty precision

Clark 2-horsepower grinder for production work or general tool grinding



ROEBLING

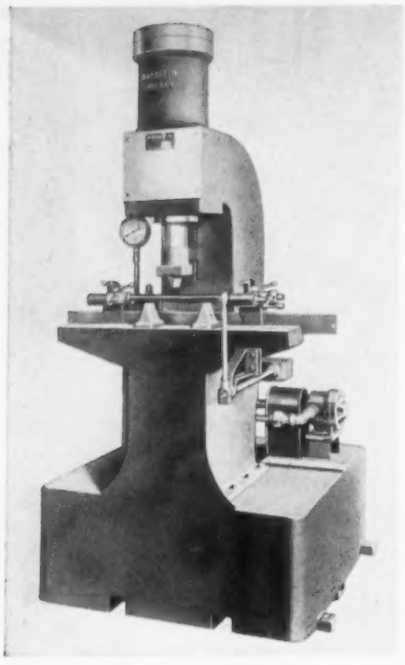
the custom-made wire for exacting welders

Not a welding wire made of ordinary tonnage steel. To the contrary . . . a wire produced of a purer and more costly steel . . . made in special small open-hearth furnaces by Roebling's custom methods. A welding wire absolutely uniform in quality and free of non-metallic impurities. ¶ Electric and gas welding types. Available in standard straight lengths and coils.

Roebling Welding Cables: Made in a complete line of rubber and braided types for arc welding purposes.

JOHN A. ROEBLING'S SONS COMPANY, TRENTON, N.J.
Branches in Principal Cities

ONLY A FINE PRODUCT MAY BEAR THE NAME ROEBLING



Hannifin sensitive straightening press designed for use on work requiring accurate straightening

type ball bearings, grease lubricated and sealed. Motor frame is of small diameter which permits maximum wheel wear and maximum clearance for the work.

• • •

Straightening Press—

Hannifin Mfg. Co., 621 South Kolmar avenue, Chicago, is the builder of a new type 20-ton hydraulic press especially designed for straightening operations on cam shafts, axle shafts and for similar work requiring accurate straightening. Simplified handling of straightening operations and increased production are features resulting from the exclusive design of the control mechanism of this press. A single lever controls the entire operation of the ram, with a sensitive proportional control action. When the control lever is moved in either direction the ram will move a proportional distance and come to rest by automatically bringing the operating valve to neutral. Hydraulic power unit, with constant delivery type rotary unit, is built into the base of the press, making a self contained unit that requires a minimum of floor space. Ram delivers 20 tons pressure, and may be fitted with any type fixture required for handling the parts to be straightened. Stroke is 6 inches, power stroke speed 69 inches per minute, return 96 inches per minute.

• • •

Luminaires—

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces a new luminaire especially designed to concentrate light on the vertical and horizontal surfaces of bins and stacks. The unit consists of a reflector and socket cover with socket. The reflector is designed to direct more light to the working plane with two triangular vanes located opposite each other to provide proper eye shields or light cutoff up and down the aisles between the bins. Sides of the reflector are slightly dipped to redirect light into the bins and cut off stray light that might otherwise be lost. Sheet steel of 24-gage enameled white inside and green outside is used in making the shade. Standard inside frosted bulbs of any desired wattage can be used.

Recent Publications of Manufacturers

Copies of any of the literature listed below may be obtained by writing directly to the companies involved, or by addressing STEEL, in care of Readers' Service Department, 1213 West Third Street, Cleveland.

Blowers—Allis-Chalmers Mfg. Co., Milwaukee. Leaflet No. 2236, illustrating various types of turbo blowers for the steel industry.

Welders—Harnischfeger Corp., Milwaukee. Bulletin No. W-8, describing single control, self-stabilization and self-excitation of its welders, with illustrations of these streamlined units.

Sicromo Steel—Timken Steel & Tube Co., Canton, O. Booklet giving analysis of new steels and discussing the effect of both silicon and chromium on the oxidation resistance of steels in which they are used.

Variable Speed Control—Reeves Pulley Co., Columbus, Ind. Booklet No. 3611, a brief inspection of some of the methods employed by twelve nationally known manufacturers in securing complete speed adjustability of production machines.

Reducing Trucking Costs—Four Wheel Drive Auto Co., Clintonville, Wis., describes in a current booklet in detail the reduction of trucking costs by FWD controlled power. Examples of savings in depreciation, maintenance, tire and fuel cost, overhead, license, taxes, insurance, and drivers' and helpers' wages are minutely explained.

Valves—Kennedy Valve Mfg. Co., Elmira, New York. Bulletin describing a new line of fully bronze-bushed standard iron-body wedge gate valves, including sectional views with references to 33 features of design.

Meters—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Catalog section No. 42-210, describing types CS-2, CS-5 and CS-8 meters and sockets; applications, construction, operation, adjustment outline dimensions and wiring diagrams are included.

Drawing Compounds—Swan Finch Oil Corp., 205 Forty-second street, New York. Folder pointing out the importance that the right grade and type of drawing compound plays in the economical protection of the metal being formed and the tools and dies used.

Testimonial Letters—Electric Storage Battery Co., Allegheny avenue and Nineteenth street, Philadelphia. Collection of testimonial letters from users of Exide-Ironclad batteries, including foundries, smelters, manufacturers, ice and coal companies, mine owners, express companies and others.

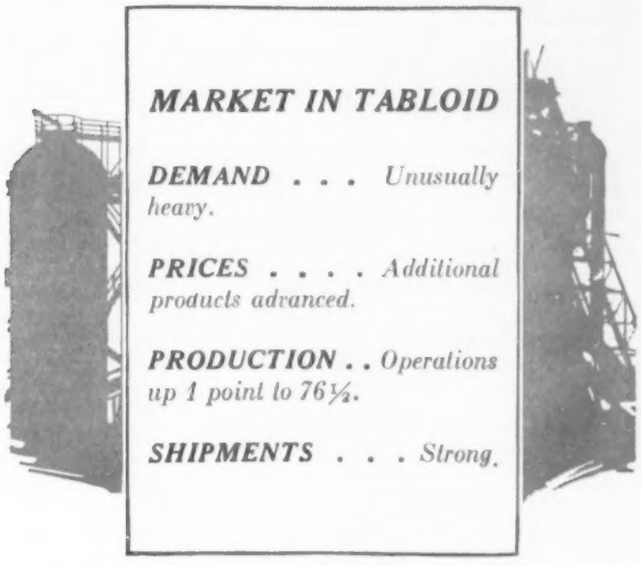
Steam Trap—Yarnall-Waring Co., Chestnut Hill, Philadelphia. Folder illustrating a cross section of the steam trap with descriptive captions on the various operating features.

Temperature Control—Brown Instrument Co., Philadelphia. Folder describing the company's controllers, illustrating the method by which they may be turned to specific process requirements; gives in detail other features and ranges of both air-operated and electric types of controllers.

Speed Reducers—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Booklet describing single and double reduction units of the single helical gear type with anti-friction bearings and splash lubrication for application in general industrial and mining operations; also includes description of construction, design, efficiency and ratings of these gear units.

Production Now Greatest Problem of Mills

National Rate 76½; Buying Wave Includes 409,000 Tons Rails


MARKET IN TABLOID
DEMAND . . . Unusually heavy.
PRICES . . . . Additional products advanced.
PRODUCTION . . Operations up 1 point to 76½.
SHIPMENTS . . . Strong.

HOW to produce the tonnage now on mill books before Jan. 1 when higher prices go in effect is the problem facing the steel industry, where backlogs have become the largest since 1929.

National operations, which last week increased 1 point to 76½ per cent of capacity, show no sign of slackening during the remainder of the month. Mills have started allotting tonnage.

Virtually all materials have been affected, but in sheets particularly the buying wave has been most noticeable. On one day, Dec. 1, the orders booked by some mills are reported to have reached proportions which would have been considered as a fair month's total not long ago.

One producer has announced that shipments at fourth quarter prices must be completed by Dec. 31, or as soon thereafter as operating schedules permit.

The week brought forth the heaviest railroad purchases in many years, aggregating 409,000 tons. Since Nov. 1 the carriers have purchased some 739,000 tons.

Automobile production, 100,395 units, was down about 3800 from last week's 104,283. This was largely because a supplier's labor trouble reacted upon the assembly lines of one of the largest manufacturers.

Although shape awards were only up about 200 tons to 17,132, the volume of new pending business was unusually extensive. The steel pipe market was featured by award for a 120-mile oil line in Texas.

Scrap Much Stronger

WITH scrap markets in most districts much stronger, predictions of higher prices are made by some experts. STEEL's scrap composite is up 13 cents to $16.25, largely the result of advances in Eastern Pennsylvania.

The iron and steel composite has gained 20 cents and is now at $34.99, reflecting the increases in steel rails and cast iron pipe. The current finished steel index is unchanged at $53.90.

The week's larger rail awards included: Atchison, Topeka & Santa Fe, 116,918 tons; Baltimore & Ohio, 52,000 tons; Norfolk & Western, 40,000 tons; Chesapeake & Ohio, 37,471; Missouri Pacific, 33,850; Chicago, Burlington & Quincy, 30,000; Chicago, Milwaukee, St. Paul & Pacific, 30,000; Erie, 21,333; Nickel Plate, 13,536; Delaware, Lackawanna & Western, 11,000; Pere Marquette, 9200; Chicago & Eastern Illinois, 7000; Atlantic Coast Line, 4000. Approximately 78,000 tons of fastenings and accessories were ordered.

The Great Northern plans to rebuild 11,000 box cars; Norfolk & Western has ordered 1000; the Santa Fe, 3025, and Pacific Fruit Express, 2000. The Santa Fe ordered 27 locomotives.

Cold-Rolled Strip Prices Up

PRICE advances for first quarter which have been announced since last week include: cold-rolled strip, up $5 a ton; railroad spikes, $3; cold-rolled lamp stock and commodity steel, $4; cold-drawn alloy bars, $4; rail steel bars to the manufacturing trade, $3; mill-run cold-rolled sheets, $4; hot-rolled sheets, pickled in the breakdown, $4. Heavy rivets are up $4 a ton. Discounts on bolts and nuts have been revised, equivalent in general to an increase of about 10 per cent. Refractories have been advanced $3 to $12 per 1000 for the first quarter. A Massachusetts pig iron producer has announced the second price increase within a month, this time for $1.25.

Average daily pig iron production in November, 98,331 gross tons, was the highest since May, 1930, and represented a gain of 1.9 per cent over the October average of 96,509 tons. However, the November total, 2,949,942 tons, was a decline of 1.4 per cent from October's 2,991,794 tons. Eleven months' production, 27,557,512 tons, is a gain of 45.6 per cent over the 18,924,987 tons in the corresponding period of 1935. At the end of November 165 stacks were active, the largest number since May, 1930.

Total shipments of Lake Superior iron ore for the season were 44,822,023 tons, compared with 28,362,368 tons in 1935, an increase of 58.03 per cent.

Operations in the Pittsburgh district were up 2 points to 70 per cent; Youngstown 3 to 78; Wheeling 3 to 92; Cleveland 2½ to 79½; New England 3 to 91. Detroit was down 5 points to 95 per cent.

COMPOSITE MARKET AVERAGES

	Dec. 5	Nov. 28	Nov. 21	One Month Ago Nov., 1936	Three Months Ago Sept., 1936	One Year Ago Dec., 1935	Five Years Ago Dec., 1931
Iron and Steel	$34.99	$34.79	$34.59	$34.65	$34.15	$33.31	$29.90
Finished Steel	53.90	53.90	53.90	53.90	53.10	53.70	47.74
Steelworks Scrap ..	16.25	16.12	16.00	16.05	16.18	13.17	8.16

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Dec. 5, 1936	Nov. 1936	Sept. 1936	Dec. 1935
Steel bars, Pittsburgh	2.05c	2.05c	1.95c	1.85c
Steel bars, Chicago	2.10	2.10	2.00	1.90
Steel bars, Philadelphia	2.36	2.36	2.26	2.16
Iron bars, Terre Haute, Ind.	1.95	1.95	1.85	1.75
Shapes, Pittsburgh	1.90	1.90	1.90	1.80
Shapes, Philadelphia	2.11½	2.11½	2.11½	2.01½
Shapes, Chicago	1.95	1.95	1.95	1.85
Tank plates, Pittsburgh	1.90	1.90	1.90	1.80
Tank plates, Philadelphia	2.09	2.09	2.09	1.99
Tank plates, Chicago	1.95	1.95	1.95	1.85
Sheets, No. 10, hot rolled, Pitts.	1.95	1.95	1.95	1.85
Sheets, No. 24, hot ann., Pitts.	2.60	2.50	2.50	2.40
Sheets, No. 24, galv., Pitts.	3.20	3.20	3.20	3.10
Sheets, No. 10, hot rolled, Gary	2.05	2.05	2.05	1.95
Sheets, No. 24, hot anneal., Gary	2.70	2.70	2.60	2.50
Sheets, No. 24, galvan., Gary	3.30	3.30	3.30	3.20
Plain wire, Pittsburgh	2.50	2.50	2.40	2.30
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pittsburgh	2.05	2.05	1.95	2.40

Semifinished Material

Sheet bars, open-hearth, Youngs.	$32.00	$32.00	$30.00	$30.00
Sheet bars, open-hearth, Pitts.	32.00	32.00	30.00	30.00
Billets, open-hearth, Pittsburgh	32.00	32.00	30.00	29.00
Wire rods, No. 5 to $\frac{13}{32}$-inch, Pitts.	40.00	40.00	38.00	38.00

Pig Iron

	Dec. 5, 1936	Nov. 1936	Sept. 1936	Dec. 1935
Bessemer, del. Pittsburgh	$21.8132	21.0632	20.8132	20.81
Basic, Valley	20.00	19.25	19.00	19.00
Basic, eastern del. East. Pa.	21.8132	21.0632	20.8132	20.81
No. 2 fdy., del. Pittsburgh	21.3132	20.5632	20.3132	20.31
No. 2 fdy., Chicago	20.50	19.75	19.50	19.50
Southern No. 2, Birmingham	16.88	15.75	15.50	15.50
Southern No. 2, del. Cincinnati	20.44	19.69	19.44	20.2007
No. 2X eastern, del. Phila.	22.6882	21.9382	21.6882	21.68
Malleable, Valley	20.50	19.75	19.50	19.50
Malleable, Chicago	20.50	19.75	19.50	19.50
Lake Sup., charcoal, del. Chicago	26.2528	26.8750	25.2528	25.2528
Gray forge, del. Pittsburgh	20.6741	19.9241	19.6741	19.67
Ferromanganese, del. Pittsburgh	80.13	80.13	80.13	90.13

Scrap

Heavy melting steel, Pittsburgh	$17.50	$17.40	$17.75	$14.05
Heavy melt. steel, No. 2, east Pa.	13.75	13.75	14.00	11.25
Heavy melting steel, Chicago	16.50	16.50	16.15	13.35
Rail for rolling, Chicago	17.25	17.25	16.75	14.50
Railroad steel specialties, Chicago	18.75	18.25	17.65	14.25

Coke

Connellsville furnace, ovens	$4.00	$4.00	$3.90	$3.55
Connellsville, foundry, ovens	4.25	4.25	4.25	4.10
Chicago, by-product foundry, del.	9.75	9.75	9.75	9.75

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week.

Finished steel prices apply on 1936 delivery; for first quarter prices have been advanced $2 on semifinished; $3 on plates, shapes, bars; $4 on strip and sheets, except enameling sheets $3

Sheet Steel

Prices Subject to Quantity Extras and Deductions (Except Galvanized)

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.95c
Gary	2.05c
Chicago, delivered	2.08c
Detroit, del.	2.15c
New York, del.	2.30c
Philadelphia, del.	2.26c
Birmingham	2.10c
St. Louis, del.	2.28c
Pacific ports, f.o.b. cars, dock	2.50c

Hot Rolled Annealed No. 24

Pittsburgh	2.60c
Gary	2.70c
Chicago, delivered	2.73c
Detroit, delivered	2.80c
New York, del.	2.95c
Philadelphia, del.	2.91c
Birmingham	2.75c
St. Louis, del.	2.935c
Pacific ports, f.o.b. cars, dock	3.25c

Galvanized No. 24

Pittsburgh	3.20c
Gary	3.30c
Chicago, delivered	3.33c
Philadelphia, del.	3.51c
New York, del.	3.55c
Birmingham	3.35c
St. Louis, del.	3.53½c
Pacific ports, f.o.b. cars, dock	3.80c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered	3.08c

Cold Rolled No. 10

Pittsburgh	2.60c
Gary	2.70c
Detroit, delivered	2.80c
Philadelphia, del.	2.91c
New York, del.	2.95c
Pacific ports, f.o.b. cars, dock	3.20c

Cold Rolled No. 20

Pittsburgh	3.05c
Gary	3.15c
Detroit, delivered	3.25c
Philadelphia, del.	3.36c
New York, del.	3.40c

Enameling Sheets

Pittsburgh, No. 10	2.45o
Pittsburgh, No. 20	3.05c
Gary, No. 10	2.55c
Gary, No. 20	3.15c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base (box) Pittsburgh	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.50c
Do., Gary	3.60c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold stp.	20.50	22.00	27.00	35.00

Steel Plate

Pittsburgh	1.90c
New York, del.	2.19c
Philadelphia, del.	2.09c
Boston, delivered	2.32c
Buffalo, delivered	2.15c
Chicago or Gary	1.95c
Cleveland, del.	2.09½c
Birmingham	2.05c
Coatesville, base	2.00c
Sparrows Pt., base	2.00c
Pacific ports, f.o.b. cars, dock	2.45c
St. Louis, delivered	2.18c

Structural Shapes

Pittsburgh	1.90c
Philadelphia, del.	2.11½c
New York, del.	2.16¼c
Boston, delivered	2.30½c
Bethlehem	2.00c
Chicago	1.95c
Cleveland, del.	2.10c
Buffalo	2.00c
Gulf Ports	2.30c
Birmingham	2.05c
Pacific ports, f.o.b. cars, dock	2.45c

Bars

Soft Steel
(Base, 3 to 25 tons)

Pittsburgh	2.05c
Chicago or Gary	2.10c
Duluth	2.20c
Birmingham	2.20c
Cleveland	2.10c
Buffalo	2.15c
Detroit, delivered	2.20c
Pacific ports, f.o.b. cars, dock	2.60c
Philadelphia, del.	2.36c
Boston, delivered	2.47c
New York, del.	2.40c
Pitts., forg. qual.	2.40c

Rail Steel
To Manufacturing Trade

Pittsburgh	1.90c
Chicago or Gary	1.95c
Moline, Ill.	1.95c
Cleveland	1.95c
Buffalo	2.00c

Iron

Terre Haute, Ind.	1.95c
Chicago	2.00c
Philadelphia	2.26c
Pittsburgh, refined	2.75-7.50c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. car docks	2.45c
Philadelphia, del.	2.26c-2.36c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight or mixed carloads; less carloads $4 higher; less carloads fencing $5 over base column.)

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails	$2.05
Cement coated nails	$2.05
Galv. nails, 15 gage and finer	$3.05
do. finer than 15 ga.	$4.55

(Per pound)

Polished staples	2.75c
Galv. fence staples	3.00c
Barbed wire, galv.	2.55c
Annealed fence wire	2.80c
Galv. fence wire	3.15c
Woven wire fencing (base column, c. l.)	$60.00

To Manufacturing Trade

Plain wire, 6-9 ga.	2.50c

Anderson, Ind. (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pitts. or Cleveland	3.05c

Do., Chicago up $1, Worc. $2.

Cold-Finished Carbon Bars and Shafting

Base, Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs.	2.55c
20,000 to 59,999 lbs.	2.50c
60,000 to 99,999 lbs.	2.25c
100,000 to 299,999 lbs.	2.42½c
300,000 lbs. and over	2.40c

Gary, Ind., Cleve., Chi., up 5c; Buffalo, up 10c; Detroit, up 15c; eastern Michigan, up 20c.

Alloy Steel Bars (Hot)

(*Base, 3 to 25 tons*)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.55c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo.	0.50
4600 0.20 to 0.30 Mo. 1.25-1.75 Ni	1.05
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring	base
*6100 bars	1.10
6100 spring	0.70
*Cr., Ni., Van.	1.40
*Carbon Van.	0.85
9200 spring flats	base
9200 spring rounds, squares	0.25

Piling

Pittsburgh	2.25c
Chicago, Buffalo	2.35c

Strip and Hoops

(Base, hot rolled, 25-1 ton)
(Base, cold-rolled, 25-3 tons)

Hot strip to 23¾-in. Pittsburgh	1.95c
Chicago or Gary	2.05c
Birmingham base	2.10c
Detroit, del.	2.15c
Philadelphia, del.	2.26c
New York, del.	2.30c
Cooperage hoop, Pittsburgh	2.05c
Chicago	2.15c
Cold strip, 0.25 carbon and under, Pitts., Cleveland	2.60c
Detroit, del.	2.81c
Worcester, Mass.	2.80c

Carbon	Cleve-Pitts.	Worcester, Mass.
0.26—0.50	2.60c	2.80c
0.51—0.75	3.70c	3.90c
0.76—1.00	5.45c	5.65c
Over 1.00	7.50c	7.70c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$39.00
Relay rails, Pitts. 20—100 lbs.	25.50-28.00
Light rails, billet qual. Pitts., Chi.	$35.00
Do., reroll. qual.	34.00
Angle bars, billet, Gary, Ind., So. Chi.	2.55c
Do., axle steel	2.10c
Spikes, R. R. base	2.75c
Track bolts, base	3.75c
Tie plates, base	2.00c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $2; 16 and 20 lbs., up $1; 12 lbs. up $2; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists:

Carriage and Machine

½ x 6 and smaller	70 off
Do. larger	65-10 off
Tire bolts	50 off

Plow Bolts

All sizes	65-10 off

Stove Bolts

In packages with nuts attached 72½ off; in packages with nuts separate 75-5 off; in bulk 81½ off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	60 off
Elevator bolts	60 off

Nuts

S. A. E. semifinished hex.: ½ to ⅞-inch	60-20-5 off
Do., ½ to 1-inch	60-20-5 off
Do., over 1-inch	60-20-5 off

Hexagon Cap Screws

Milled	50-10 off
Upset, 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	75 off
Headless set screws	75 off

Rivets, Wrought Washers

*Struc., c. l., Pittsburgh, Cleveland	3.25c
*Struc., c. l., Chicago	3.35c
⅞-in. and smaller, Pitts., Chi., Cleve.	70-5 off
Wrought washers, Pitts., Chi., Phila. to jobbers and large nut, bolt mfrs.	$6.00 off

Cut Nails

Cut nails, Pitts.; (10% discount of size extras)	$2.90
Do., less carloads, 5 kegs or more, no discount on size extras	$3.20
Do., under 5 kegs; no disc. on size extras	$3.35

Pipe and Tubing

Base $200 net ton, except on less boiler tubes under 2 inches and cold drawn seamless.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Galv.
¼ and ⅜	60	44½
½	64½	55
¾	67½	59
1—3	69½	61½

Iron

⅛	31½	15
¼	36½	20½
⅜	39½	25½
½	41½	26

Lap Weld

Steel

2	62	53½
2½—3	65	56½
3½—6	67	58½
7 and 8	66	56½
9 and 10	65½	56

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½

Line Pipe

Steel

⅛, butt weld	56	
¼ and ⅜, butt weld	59	
½, butt weld	63½	
¾, butt weld	66½	
1 to 3, butt weld	68½	
2, lap weld	61	
2½ to 3, lap weld	64	
3½ to 6, lap weld	66	
7 and 8, lap weld	65	

Iron

⅛—1½ inch, black and galv. take 4 pts. over; 2½—6-inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.

Boiler Tubes

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		Charcoal Iron	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 pts. under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ⅛ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound. Less-carloads revised as of July 1, 1935, card.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices being on lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

*6-in. & over, Birm.	$41.00-42.00
*4-in., Birmingham	44.00-45.00
4-in., Chicago	52.40-53.40
6 to 24-in., Chicago	49.40-50.40
6-in. & over, east. fdy.	45.00
Do., 4-in.	46.00

Class A pipe $3 over Class B
Stnd. fitgs., Birm. base $100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., Buffalo and Young.	$32.00
Philadelphia	37.67
Duluth	34.00

Forging Billets

6 x 6 to 9 x 9-in., base

Pitts., Chicago, Buffalo	39.00
Forging, Duluth	41.00

Sheet Bars

Pitts., Cleve., Young., Chi., Buffalo, Canton, Sparrows Point	32.00

Slabs

Pitts., Chicago, Cleveland, Youngstown	32.00

Wire Rods

Pitts., Cleve., No. 5 to ⅝-inch incl.	40.00
Do., over ⅝ to ⅞-inch incl.	42.00

Chicago up $1; Worcester up $2

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.80c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75- 4.00
Connellsville, fdry.	4.25- 4.50
Connell. prem. fdry.	5.50
New River fdry.	6.00
Wise county fdry.	4.45- 5.00
Wise county fur.	4.00- 4.50

By-Product Foundry

Newark, N. J., del.	10.20-10.65
Chi., ov., outside del.	9.00
Chicago, del.	9.75
New England, del.	12.00
St. Louis, del.	10.00-10.50
Birmingham, ovens	6.50
Indianapolis, del.	9.40
Cincinnati, del.	9.50
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.70
Philadelphia, del.	9.88

Coke By-Products

Spot gal. Producers' Plants

Pure and 90% benzol	16.00c
Toluol	30.00c
Solvent naphtha	30.00c
Industrial xylol	30.00c

Per lb. f.o.b. Frankford

Phenol (200 lb. drums)	15.50c
Do., (450 lbs.)	14.50c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls., to jobbers	8.25c

Per 100 lbs. Atlantic seaboard

Sulphate of ammonia	$1.30

†Western prices, ⅛-cent up.

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
'Bethlehem, Pa.	$21.50	$22.00	$21.00	$22.50
Birdsboro, Pa.	21.50	22.00	21.00	22.50
Birmingham, Ala.	16.88	.....	15.88	22.00
'Buffalo	20.50	21.00	19.50	21.50
'Chicago	20.50	20.50	20.00	21.00
'Cleveland	20.50	20.50	20.00	21.00
'Detroit	20.50	20.50	20.00	21.00
Duluth	21.00	21.00	.....	21.50
Erie, Pa.	20.50	21.00	20.00	21.50
•Everett, Mass.	22.75	23.25	22.25	23.75
'Hamilton, O.	20.50	20.50	20.00	.....
Jackson, O.	20.25	20.25	19.75	.....
'Neville Island, Pa.	20.50	20.50	20.00	21.00
'Provo, Utah	18.50	.....	18.00	.....
Sharpsville, Pa.	20.50	20.50	20.00	21.00
'Sparrows Point, Md.	21.50	.....	21.00	.....
'Swedeland, Pa.	21.50	22.00	21.00	22.50
'Toledo, O.	20.50	20.50	20.00	21.00
'Youngstown, O.	20.50	20.50	20.00	21.00
Delivered from Basing Points:				
'Akron, O., from Cleveland	21.76	21.76	21.26	22.26
'Baltimore from Birmingham	22.08	.....	20.96	.....
'Boston from Birmingham	21.62	.....	21.50	.....
Boston from Everett, Mass.	22.00	22.50	21.50	23.00
'Boston from Buffalo	22.00	22.50	21.50	23.00
'Brooklyn, N. Y., from Bethlehem	23.93	24.43	.....	.....
'Brooklyn, N. Y., from Bmghm.	23.55	.....	.....	.....
'Canton, O., from Cleveland	21.76	21.76	21.26	22.26
'Chicago from Birmingham	†20.72	.....	20.60	.....
'Cincinnati from Hamilton, O.	20.82	21.58	21.08	.....
'Cincinnati from Birmingham	20.44	.....	19.82	.....
'Cleveland from Birmingham	20.62	.....	20.12	.....
'Cincinnati from Hamilton, O.	22.17	22.77	22.27	.....
'Mansfield, O., from Toledo, O.	22.26	22.26	21.76	22.76
'Milwaukee from Chicago	21.57	21.57	21.27	22.07
'Muskegon, Mich., from Chicago, Toledo or Detroit	23.60	23.60	23.10	24.10
'Newark, N. J., from Birmingham	22.61	.....	.....	.....
'Newark, N. J., from Bethlehem	22.99	23.49	.....	.....
'Philadelphia from Birmingham	21.93	.....	21.81	.....
'Philadelphia from Swedeland, Pa.	22.31	22.81	21.81	.....
'Pittsburgh district from Neville Island	Neville base plus 67c, 81c and $1.21 switching charges			
'Saginaw, Mich., from Detroit	22.75	22.75	22.25	22.25
'St. Louis, northern	21.00	21.00	20.50	.....
Delivered from Basing Points:				
St. Louis from Birmingham	†20.68	.....	20.50	.....
St. Paul from Duluth	22.94	22.94	.....	23.44

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $25.00, Phila. base, standard and copper bearing, $26.13.

Gray Forge		Charcoal	
Valley furnace	$20.00	Lake Superior fur.	$23.09
Pitts. dist. fur.	20.00	do., del. Chicago	26.25
		Lyles, Tenn.	23.50

Silvery†

Jackson county, O., base: 6-6.50 per cent $24.00; 6.51-7—$24.50; 7-7.50—$25.00; 7.51-8—$25.50; 8-8.50—$26.00; 8.51-9—$26.50; 9-9.50—$27.00; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$55.00

First Quality

Pa., Ill., Md., Mo., Ky.	$45.00
Alabama, Georgia	$38.00-45.00

Second Quality

Pa., Ill., Ky., Md., Mo.	40.00
Georgia, Alabama	35.00

Ohio

First quality	$40.00
Intermediary	37.00
Second quality	28.00

Malleable Bung Brick

All bases	50.00

Silica Brick

Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	48.00

Ladle Brick (Dry Press)

Pa., O., W. Va., Mo.	$24.00
do., wire cut	22.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	40.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	22.00

Base Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$45.00
Chem. bonded chrome	45.00
Magnesite brick	65.00
Chem. bonded magnesite	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$22.50
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$18.00
Do., for barge	$19.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	75.00
Do., Baltimore, base	75.00
Do., del. Pittsburgh	80.13
Spiegeleisen, 19-20% dom. Palmerston, Pa., spot†	26.00
Do., New Orleans	26.00
Ferrosilicon, 50% freight allowed, c. l.	69.50
Do., less carload	77.00
Do., 75 per cent	126-130.00
Spot, $5 a ton higher.	
Silicoman., 2½ carbon	85.00
2% carbon, 90.00; 1%,	100.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.00
Ferrotungsten, stand., lb. con. del.	1.30-1.40
Ferrovanadium, 35 to 40% lb., cont.	2.70-2.90
Ferrotitanium, c. l., prod. plant, frt. all., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
Do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $3 unitage	58.50
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $3 unitage	75.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads. Quan. diff. apply

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Chinese Spot, N. Y.	Nickel Cathodes
Nov. 28	10.50	10.62½	10.12½	52.37½	51.80	5.20	5.05	5.05	•19.00	12.50	35.00
Nov. 30	10.50	10.62½	10.12½	51.87½	51.45	5.20	5.05	5.05	•19.00	12.50	35.00
Dec. 1	10.50	10.62½	10.12½	51.37½	50.85	5.20	5.05	5.05	•19.00	12.50	35.00
Dec. 2	10.50	10.62½	10.12½	51.25	50.75	5.20	5.05	5.05	•19.00	12.50	35.00
Dec. 3	10.50	10.62½	10.12½	50.87½	50.40	5.20	5.05	5.05	•19.00	12.50	35.00
Dec. 4	10.50	10.62½	10.12½	50.62½	50.10	5.20	5.05	5.05	•19.00	12.75	35.00

•Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 10.50c Conn. copper

Sheets

Yellow brass (high)	16.25
Copper, hot rolled	18.25
Lead, cut to jobbers	8.75
Zinc, 100-lb. base	9.50

Tubes

High yellow brass	18.50
Seamless copper	18.75

Rods

High yellow brass	14.25
Copper, hot rolled	15.00

Anodes

Copper, untrimmed	15.75

Wire

Yellow brass (high)	16.50

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass

New York	6.75-6.87½
Cleveland	7.50- 7.75
Chicago	7.00- 7.25
St. Louis	6.75- 7.25

Heavy Copper and Wire

New York, No. 1	8.25-8.37½
•Chicago, No. 1	8.50- 8.75
Cleveland, No. 1	8.50-8.75
St. Louis, No. 1	8.25- 8.75

Composition Brass Borings

New York	6.25-6.37½

Light Copper

New York	7.25-7.37½
Chicago	6.75- 7.00
Cleveland	6.75- 7.00
St. Louis	6.75- 7.25

Light Brass

•Chicago	4.25- 4.50
Cleveland	4.25- 4.50
St. Louis	3.75- 4.25

Lead

New York	4.37½- 4.50
Cleveland	4.00- 4.25
Chicago	4.00- 4.25
St. Louis	4.00- 4.25

Zinc

New York	2.50-2.62½
St. Louis	2.50- 3.00
Cleveland	2.50- 2.75

Aluminum

Borings, Cleve.	9.75-10.00
Mixed, cast, Cleve.	13.00-13.25
Mixed, cast, St. L.	13.00-13.25
Clips, soft, Cleve.	14.75-15.00

SECONDARY METALS

Brass ingot, 85-5-5-5, l.c.l.	10.75
Stand. No. 12 alum.	16.75-17.25

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham†	11.00-13.00
Bos. dock, No. 1 exp.	†12.00
N. Eng. del. No. 1	12.75
Buffalo, No. 1	16.00-16.50
Buffalo, No. 2	14.50-15.00
Chicago, No. 1	16.25-16.75
Cleveland, No. 1	15.50-16.00
Cleveland, No. 2	15.00-15.50
Detroit, No. 1	13.00-13.50
Eastern Pa., No. 1	15.00-15.50
Eastern Pa., No. 2	13.50-14.00
Federal, Ill.	13.50-14.00
Granite City, R. R.	15.25-15.75
Granite City, No. 2	13.50-14.00
New York, No. 1	†11.25-11.75
N. Y. dock, No. 1 exp.	†11.25-11.75
Pitts., No. 1 (R. R.)	17.75-18.25
Pitts., No. 1 (dlr.)	17.25-17.75
Pittsburgh, No. 2	16.00-16.50
St. Louis, R. R.	15.50-16.00
St. Louis, No. 2	13.50-14.00
Toronto, dlrs. No. 1	10.50-11.00
Toronto, No. 2	9.50-10.00
Valleys, No. 1	16.75-17.25

COMPRESSED SHEETS

Buffalo, dealers	14.50-15.00
Chicago, factory	15.50-16.00
Chicago, dealer	14.00-14.50
Cleveland	15.00-15.50
Detroit	13.50-14.00
E. Pa., new mat.	15.00
E. Pa., old mat.	12.50-13.00
Pittsburgh	17.25-17.75
St. Louis	11.00-11.50
Valleys	16.50-16.75

BUNDLED SHEETS

Buffalo	12.75-13.25
Cincinnati, del.	10.00-10.50
Cleveland	12.50-13.00
Pittsburgh	16.00-16.50
St. Louis	8.75- 9.25
Toronto, dealers	4.50

SHEET CLIPPINGS, LOOSE

Chicago	10.50-11.00
Cincinnati	9.00- 9.50
Detroit	10.00-10.50
St. Louis	8.00- 8.50

STEEL RAILS, SHORT

Birmingham	14.00-16.00
Buffalo	18.50-19.50
Chicago (3 ft.)	17.50-18.00
Chicago (2 ft.)	19.00-19.50
Cincinnati, del.	17.50-18.00
Detroit	16.50-17.00
Pitts., open-hearth, 3 ft. and less	20.50-21.00
St. Louis, 2 ft. & less	16.00-16.50

STEEL RAILS, SCRAP

Boston district	†11.25
Buffalo	16.50-17.00
Chicago	16.25-16.75
Pittsburgh	18.00-18.50
St. Louis	15.50-16.00
Toronto, dealers	8.50

STOVE PLATE

Birmingham	8.00- 9.00
Boston district	†7.25
Buffalo	12.25-12.75
Chicago	9.00- 9.50
Cincinnati, dealers	9.50-10.00
Detroit, net	9.00- 9.50
Eastern Pa.	12.00-12.50
New York, fdry.	†10.00
St. Louis	8.50- 9.00
Toronto, deal'rs, net	5.50- 6.00

SPRINGS

Buffalo	17.50-18.00
Chicago springs	19.00-19.50
Eastern Pa.	19.50-20.00
Pittsburgh	21.00-21.50
St. Louis	17.00-17.50

ANGLE BARS—STEEL

Chicago	18.00-18.50
St. Louis	15.50-16.00
Buffalo	14.50-15.00

RAILROAD SPECIALTIES

Chicago	18.50-19.00

LOW PHOSPHORUS

Buffalo, billet and bloom crops	18.50-19.00
Cleveland, billet, bloom crops	19.00-19.50
Eastern Pa., crops	20.00-20.50
Pittsburgh, billet, bloom crops	21.50-22.00
Pittsburgh, sheet bar crops	19.50-20.00

FROGS, SWITCHES

Chicago	16.25-16.75
St. Louis, cut	15.50-16.00

SHOVELING STEEL

Chicago	16.25-16.75
Federal, Ill.	13.50-14.00
Granite City, Ill.	13.50-14.00
Toronto, dealers	6.50

RAILROAD WROUGHT

Birmingham	8.00- 9.00
Boston, district	†8.00- 8.25
Buffalo, No. 1	14.50-15.00
Buffalo, No. 2	16.00-16.50
Chicago, No. 1, net	14.00-14.50
Chicago, No. 2	16.25-16.75
Cincinnati, No. 2	14.50-15.00
Eastern Pa.	15.50-16.00
St. Louis, No. 1	13.00-13.50
St. Louis, No. 2	15.00-15.50
Toronto, No. 1 dlr.	7.00

SPECIFICATION PIPE

Eastern Pa.	14.00-14.50
New York	†10.00-10.50

BUSHELING

Buffalo, No. 1	14.50-15.00
Chicago, No. 1	14.75-15.25
Cincin., No. 1, deal.	11.50-12.00
Cincinnati, No. 2	7.00- 7.50
Cleveland, No. 2	11.00-11.50
Detroit, No. 1, new	12.50-13.00
Valleys, new, No. 1	16.00-16.50
Toronto, dealers	6.00

MACHINE TURNINGS

Birmingham	6.00- 6.50
Buffalo	9.75-10.25
Chicago	8.50- 9.00
Cincinnati, dealers	8.00- 8.50
Cleveland	10.50-11.00
Detroit	8.25- 8.75
Eastern Pa.	10.00
New York	†5.00- 5.50
Pittsburgh	11.75-12.25
St. Louis	6.00- 6.50
Toronto, dealers	4.00- 4.50
Valleys	10.75-11.25

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†5.50
Buffalo	10.00-10.50
Cincinnati, dealers	7.00- 7.50
Cleveland	11.00-11.50
Detroit	9.00- 9.50
Eastern Pa.	8.50- 9.00
New York	†4.25- 4.75
Pittsburgh	11.50-12.00
Toronto, dealers	4.00

CAST IRON BORINGS

Birmingham	6.00- 6.50
Boston dist. chem.	†7.00
Boston dist. for mills	†6.75
Buffalo	10.00-10.50
Chicago, dealers	9.00- 9.50
Cincinnati, dealers	7.00- 7.50
Cleveland	11.00-11.50
Detroit	9.00- 9.50
E. Pa., chemical	10.50-13.00
New York	5.75- 6.25
St. Louis	7.00- 7.50
Toronto, dealers	4.50- 5.00

PIPE AND FLUES

Cincinnati, dealers	9.00- 9.50
Chicago, net	8.00- 8.50

RAILROAD GRATE BARS

Buffalo	11.00-11.50
Chicago, net	10.00-10.50
Cincinnati	9.50-10.00
Eastern Pa.	12.00-12.50
New York	†8.00- 8.50
St. Louis	10.50-11.00

FORGE FLASHINGS

Buffalo district	9.55
Buffalo	14.50-15.00
Cleveland	14.50-15.00
Detroit	12.00-12.50
Pittsburgh	15.75-16.25

FORGE SCRAP

Boston district	†6.50- 7.00
Chicago, heavy	18.00-18.50
Eastern Pa.	14.00-14.50

ARCH BARS, TRANSOMS

St. Louis	16.50-17.00

AXLE TURNINGS

Boston district	†7.25- 7.50
Buffalo	12.50-13.00
Chicago, elec. fur.	16.00-16.50
Eastern Pa.	13.00-14.00
St. Louis	10.50-11.00
Toronto	4.50

STEEL CAR AXLES

Birmingham	14.50-16.00
Boston district	†14.50-15.00
Buffalo	18.50-19.50
Chicago, net	18.50-19.00
Eastern Pa.	21.50
St. Louis	17.00-17.50
Toronto	8.50

SHAFTING

Boston district	†15.75-16.00
Eastern Pa.	20.50-21.00
New York	†15.50-16.00
St. Louis	15.00-15.50

CAR WHEELS

Birmingham	14.00-15.50
Boston dist. iron	†11.00-11.50
Buffalo, iron	16.00-17.00
Buffalo, steel	18.50-19.00
Chicago, iron	17.00-17.50
Chicago, rolled steel	18.50-19.00
Cincinnati, iron	14.00-14.50
Eastern Pa., iron	16.50-17.00
Eastern Pa., steel	19.50-20.00
Pittsburgh, iron	18.00-18.50
Pittsburgh, steel	20.50-21.00
St. Louis, iron	14.00-14.50
St. Louis, steel	17.00-17.50
Toronto, net	8.50

NO. 1 CAST SCRAP

Birmingham	11.50-12.50
Bos. dis. No. 1 mch.	†11.00-11.25
N. Eng., del. No. 2	†9.00- 9.50
N. Eng., del. textile	12.00-12.50
Buffalo, cupola	15.00-15.50
Buffalo, mach.	16.00-16.50
Chicago, agri. net	12.00-12.50
Chicago, auto	12.50-13.00
Chicago, mach. net	14.00-14.50
Chicago, railr'd net	13.00-13.50
Cinci., mach. cup.	14.50-15.00
Cleveland, mach.	16.25-16.75
Eastern Pa., cupola	16.50
E. Pa., mixed yard	14.00-14.50
Pittsburgh, cupola	17.00-17.50
San Francisco, del.	13.50-14.00
Seattle	10.00-11.00
St. Louis, No. 1	12.50-13.00
St. L. No. 1, mach.	13.00-13.50
Toronto, No. 1, mach., net	9.50-10.00

HEAVY CAST

Boston, dist. break.	†10.00
New England del.	11.00-11.50
Buffalo, break.	13.50-14.00
Cleveland, break.	13.00-13.50
Detroit, No. 1 mach. net	13.50-14.00
Detroit, break.	11.50-12.00
Detroit, auto net	13.50-14.00
Eastern Pa.	15.50
New York, break.	†10.50-11.00
Pittsburgh	14.50-15.00

MALLEABLE

Birmingham, R. R.	13.50-14.00
New England, del.	†16.25-17.50
Buffalo	17.00-17.50
Chicago, R. R.	18.50-19.00
Cinci., agri. del.	14.00-14.50
Cleveland, rail.	17.50-18.00
Detroit, auto, net	14.50-15.00
Eastern Pa., R. R.	16.50-17.50
Pittsburgh, rail	17.50-18.00
St. Louis, R. R.	15.50-16.00
Toronto, net	7.00

RAILS FOR ROLLING

5 feet and over

Birmingham	14.00-15.00
Birmingham	†11.00-11.50
Buffalo	17.50-18.50
Chicago	17.00-17.50
Eastern Pa.	17.00-17.50
New York	†12.00-12.50
St. Louis	16.50-17.00

LOCOMOTIVE TIRES

Chicago (cut)	18.00-18.50
St. Louis, No. 1	13.50-14.00

LOW PHOS. PUNCHINGS

Buffalo	18.00-18.50
Chicago	19.00-19.50
Eastern Pa.	18.50-19.00
Pittsburgh (heavy)	20.00-20.50
Pittsburgh (light)	19.50-20.00

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.50- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	13.50
No. Afr. low phos.	13.50
Swedish low phos.	11.50
Spanish No. Africa basic, 50 to 60%	12.50
Tungsten, spot sh. ton unit, duty pd.	$15.85-16.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	19.50-19.75

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52%	30.00
So. African, 50-52%	30.00
Indian, 50-52%	30.00

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS

Baltimore*	3.20c
Boston††	3.30c
Buffalo	3.10c
Chattanooga	3.56c
Chicago (j)	3.20c
Cincinnati	3.42c
Cleveland	3.10c
Detroit	3. 29c
Houston	3.10c
Los Angeles	3.80c
Milwaukee	3.31c-3.46c
New Orleans	3.55c
New York‡ (d)	3.51c
Pitts. (h)	3.15c-3.30c
Philadelphia*	3.25c
Portland	3.70c
San Francisco	3.60c
Seattle	4.05c
St. Louis	3.45c
St. Paul	3.45c-3.60c
Tulsa	3.35c

IRON BARS

Portland	3.50c
Chattanooga	3.56c
Baltimore*	3.10c
Cincinnati	3.42c
New York‡ (d)	3.15c
Philadelphia*	3.25c
St. Louis	3.45c
Tulsa	3.35c

REINFORCING BARS

Buffalo	2.60c
Chattanooga	3.56c
Chicago	2.10c-2.60c
Cleveland (c)	2.10c
Cincinnati	3.25c
Houston	3.25c
Los Angl., cl.	2.45c
New Orleans	3.50c
Pitts., plain (h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	3.65c
St. Louis	3.35c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES

Baltimore*	3.10c
Boston††	3.29c
Buffalo	3.35c
Chattanooga	3.66c
Chicago	3.30c
Cincinnati	3.52c
Cleveland	3.41c
Detroit	3.52c
Houston	3.10c
Los Angeles	3.80c
Milwaukee	3.41c
New Orleans	3.65c
New York‡ (d)	3.47c
Philadelphia*	3.10c
Pittsburgh (h)	3.25c
Portland (l)	3.75c
San Francisco	3.60c
Seattle (l)	3.90c
St. Louis	3.55c
St. Paul	3.55c
Tulsa	3.60c

PLATES

Baltimore*	3.10c
Boston††	3.31c
Buffalo	3.47c
Chattanooga	3.66c
Chicago	3.30c
Cincinnati	3.52c
Cleveland, ¼-in. and over	3.41c
Detroit	3.52c
Detroit, ⅜-in.	3.85c
Houston	3.10c
Los Angeles	3.60c
Milwaukee	3.41c
New Orleans	3.65c
New York‡ (d)	3.50c
Philadelphia*	3.10c
Phila. floor	4.95c
Pittsburgh (h)	3.25c
Portland	3.75c
San Francisco	3.80c
Seattle	3.90c
St. Louis	3.55c
St. Paul	3.55c
Tulsa	3.60c

NO. 10 BLUE

Baltimore*	3.20c
Boston (g)	3.40c
Buffalo	3.72c
Chattanooga	3.46c
Chicago	3.15c
Cincinnati	3.32c
Cleveland	3.21c
Det. 8-10 ga.	3.24c
Houston	3.45c
Los Angeles	3.90c
Milwaukee	3.26c
New Orleans	3.65c
New York‡ (d)	3.41c
Portland	3.85c
Philadelphia*	3.20c
Pittsburgh (h)	3.05c
San Francisco	3.60c
Seattle	4.05c
St. Louis	3.40c
St. Paul	3.40c
Tulsa	3.80c

NO. 24 BLACK

Baltimore*†	3.80c
Boston (g)	4.05c
Buffalo	3.35c
Chattanooga*	3.36c
Chicago	3.55c-4.55c
Cincinnati	3.97c
Cleveland	4.01c
Detroit	4.14c
Los Angeles	4.35c
Milwaukee	4.16c
New Orleans*	3.32c
New York‡ (d)	4.10c
Philadelphia*†	3.85c
Pitts.** (h)	3.65c-4.95c
Portland	4.30c
Seattle	4.80c
San Francisco	4.20c
St. Louis	3.30c
St. Paul	4.10c
Tulsa	4.85c

NO. 24 GALV. SHEETS

Baltimore *†	3.90c
Buffalo	4.10c
Boston (g)	4.00c
Chattanooga*	3.96c
Chicago (h)	4.15c-5.15c
Cincinnati	4.82c
Cleveland	4.61c
Detroit	4.82c
Houston	4.50c
Los Angeles	4.60c
Milwaukee	4.76c
New Orleans*	3.92c
New York‡ (d)	4.50c
Philadelphia*†	4.50c
Pitts.** (h)	4.30c-5.55c
Portland	4.60c
San Francisco	5.00c
Seattle	5.30c
St. Louis	4.90c
St. Paul	4.60c
Tulsa	5.20c

BANDS

Baltimore*	3.30c
Boston††	3.40c
Buffalo	3.52c
Chattanooga	3.71c
Chicago	3.40c
Cincinnati	3.57c
Cleveland	3.46c
Detroit, ⅜-in. and lighter	3.49c
Houston	3.35c
Los Angeles	4.30c
Milwaukee	3.51c
New Orleans	4.05c
New York‡ (d)	3.66c
Philadelphia*	3.30c
Pittsburgh (h)	3.30c
Portland	4.35c
San Francisco	4.20c
Seattle	4.55c
St. Louis	3.65c
St. Paul	3.65c
Tulsa	3.55c

HOOPS

Baltimore	3.55c
Boston ††	4.40c
Buffalo	3.52c
Chicago	3.40c
Cincinnati	3.57c
Det., No. 14 and lighter	3.49c
Los Angeles	6.05c
Milwaukee	3.51c
New York‡ (d)	3.66c
Philadelphia*	3.55c
Pittsburgh (h)	3.80c
Portland	5.85c
San Francisco	6.25c
Seattle	5.90c
St. Louis	3.65c
St. Paul	3.65c

COLD FIN. STEEL

Baltimore (c)	3.98c
Boston*	4.15c
Buffalo (h)	3.70c
Chattanooga*	4.38c
Chicago (h)	3.75c
Cincinnati	3.97c
Cleveland (h)	3.75c
Detroit	3.84c
Los Ang. (f) (d)	6.10c
Milwaukee	3.86c
New Orleans	4.55c
New York‡ (d)	3.96c
Philadelphia*	4.01c
Pittsburgh	3.60c
Portland (f) (d)	6.25c
San Fran. (f) (d)	6.05c
Seattle (f) (d)	6.25c
St. Louis	4.00c
St. Paul	4.27c
Tulsa	4.80c

COLD ROLLED STRIP

Boston	3.245c
Buffalo	3.39c
Chicago	3.27c
Cincinnati (b)	3.22c
Cleveland (b)	3.00c
Detroit	3.18c
New York‡ (d)	3.36c
St. Louis	3.41c

TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up).

	Base
High Speed	59½c
High carbon, high chrome	39c
Oil hardening	23c
Special tool	21c
Extra tool	17½c
Regular tool	14½c

Uniform extras apply

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	65
Cleveland	70
Detroit	70
Milwaukee	70
Pittsburgh	65-5

(a) Under 100 lbs., 60 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Quantity base; (e) New mill classif. (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less; (i) Under 3 in. (j) Shapes other than rounds, flats, fillet angles, 3.35c.

Prices on heavier lines are subject to new quantity differentials: 399 lbs. and less, up 50 cts.; 400 to 3999 lbs., base; 4000 to 7999 lbs., 15 cts., under; 8000 to 14,999 lbs., 25 cts. under; 15,000 to 39,999 lbs., 35 cts. under; 40,000 lbs. and over, 50 cts. under; (except Boston).

‡Domestic steel; •Plus quan. extras; ••Under 25 bundles. •†50 or more bundles; †New extras apply. ††Base 40,000 lbs., extras on less.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Dec. 3

Export Prices f. o. b. Ship at Port of Dispatch—(By Cable or Radio)

	British gross tons U. K. ports £ s d	Continenta Channel or North Sea ports, metric tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$15.28 3 2 6•	$14.23	1 15 0
Basic bessemer	15.28 3 2 6•	11.79	1 9 0
Hematite, Phos. .03-.05	18.34 3 1 5 0	.....	.....
SEMIFINISHED STEEL			
Billets	$28.73 5 17 6	$19.10	2 7 0
Wire rods, No. 5 gage	43.77 8 19 0	36.61	4 10 0
FINISHED STEEL			
Standard rails	$40.34 8 5 0	$44.74	5 10 0
Merchant bars	1.85c 8 10 0	1.20c	3 5 0
Structural shapes	1.80c 8 5 0	1.14c	3 1 6
Plates, †¼-in. or 5 mm.	1.88c 8 12 6	1.60	4 6 6
Sheets, black, 24 gage or 0.5 mm	2.23c 10 5 0	2.30c	6 5 0††
Sheets, gal., 24 gage, corr.	2.80c 12 15 0	2.76c	7 10 0
Bands and strips	2.02c 9 5 0	1.48c	4 0 0
Plain wire, base	2.13c 9 15 0	1.94c	5 5 0
Galvanized wire, base	2.51c 11 10 0	2.15c	5 17 6
Wire nails, base	2.62c 12 0 0	1.75c	4 15 0
Tin plate, box 108 lbs.	$ 4.58 0 18 9	.....	.....

British ferromanganese $75 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d ($43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d	French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$18.34 3 15 0(a)	$14.65	315	$15.54	460	$25.37 63
Basic bessemer pig iron	18.34 3 15 0(a)	8.83	190	14.53	430	27.99 (b)69.50
Furnace coke	5.26 1 1 6	5.91	127	4.63	137	7.65 19
Billets	29.95 6 2 6	22.32	480	19.60	580	38.86 96.50
Standard rails	1.80c 8 5 0	1.49c	711	1.73c	1,150	2.38c 132
Merchant bars	2.04c 9 7 0	1.40c	665	1.05c	700	1.98c 110
Structural shapes	2.05c 9 7 6	1.37c	650	1.05c	700	1.93c 107
Plates, †¼-in. or 5 mm.	2.11c 9 13 9	1.74c	830	1.28c	850	2.29c 127
Sheets, black	2.62c 12 0 0‡	2.10c	1,000‡	1.39c	925‡	2.59c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	3.05c 14 0 0	3.15c	1,500	2.25c	1,500	6.66c 370
Plain wire	2.18c 10 0 0	2.42c	1,150	1.95c	1,300	3.11c 173
Bands and strips	2.20c 10 2 0	1.62c	770	1.28c	850	2.29c 127

•Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. a del. Middlesbrough. b hematite. ††Close annealed.

**Gold pound sterling carries a premium of 67.00 per cent over paper sterling.

Bars

Bar Prices, Page 90

Pittsburgh—Subsequent to the price advance announced ten days ago on hot-rolled merchant bars, a $3 a ton increase has been named for effect with first quarter on rail steel bars to the manufacturing trade, which will advance the present market from 1.90c to 2.05c. As previously reported, soft steel bars will be advanced to 2.20c, Pittsburgh, for effect on first-quarter shipments.

Cleveland — Bar consumers have been ordering heavily with the purpose of not only taking advantage of the present low prices but in some cases to get the best delivery possible to meet their own schedules. This condition has forced some mills out of the market on most grades, for they already have enough tonnage to carry them through the greater portion of January.

Chicago—While bar producers still accept tonnages at fourth quarter prices, full operations appear assured for the next 60 days in view of the substantial backlogs which have been acquired. Consumption continues heavy, with labor trouble in the automotive and farm implement industries the principal deterrent to operations of these two groups.

Boston—Buying of soft steel bars against the $3 advance for first quarter delivery has been heavy. At least one seller has indicated that tonnage booked at the old price of 2.47c delivered Boston which cannot be delivered before the end of the quarter will be carried over into January.

New York—Commercial bar buying continues active with fourth quarter prices still applying. Leading sellers are inclined to accept business at these prices where deliveries can be made by the end of January. In some cases delivery is to be at mill convenience.

Philadelphia—With sellers of commercial bars generally still accepting tonnage at old prices a good flow of business continues. It appears further coverage at existing prices will be possible until the end of the month, especially where deliveries can be obtained not later than the end of January.

Youngstown, O.—Steel bar mills in this district are brought face to face with a barrage of fourth quarter specifications that they are finding themselves physically unable to satisfy until well into January. Allotments are being figured out according to customers' usual tonnage.

Shafer Bearing Corp. has removed its general offices to 35 East Wacker drive, Chicago.

Plates

Plate Prices, Page 90

Pittsburgh—Vesta Coal Co. has awarded a contract for 25 all-steel all-welded standard coal barges, each 175 feet in length, to the shops of its parent company, Jones & Laughlin Steel Corp. An inquiry for about 4000 tons in a 446 x 68-foot steel floating drydock specified as "ARD-2" from the navy department at Pearl Harbor, Hawaii, is being circulated and other marine work finds inquiry out for five sand barges on the Ohio river and an inquiry for one to four oil barges for another buyer. Bids will be taken on a wrought iron barge, believed to be the first to be built in many years, by the Huntington army engineers Dec. 21. It will be 151 x 46 x 7½ feet. At the same time bids will be taken on a 35-ton whirler derrick boat, 110 x 52 x 8 feet, which will be equipped with one 155-foot and one 125-foot boom. Plate

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MADE FROM ¼" STEEL WEIGHT 25 LBS.

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BUFFALO, N. Y.

NEW YORK — CHICAGO — PHILADELPHIA — DETROIT — CLEVELAND

users are still able to obtain 1.90c, f.o.b. Pittsburgh, but will be obliged to pay 2.05c, Pittsburgh, after Jan. 1.

Chicago—Plate buying has been stimulated only moderately by the higher first quarter price, but heavy orders for railroad equipment shortly will be reflected in plate mill books. Plate needs of structural fabricators are relatively light, but a fairly large tonnage is pending for other fabricated work. An unidentified pipe line will take 7000 tons.

Cleveland—Mills report a marked increase in demand, thereby extending deliveries to five or six weeks and compelling some to refuse orders of large tonnages because of the inability to meet required deliveries. Many feel that this condition is due directly to the recent advance of $3 a ton, effective the first quarter. Pending tonnage involving ship repair work and locomotive awards is expected to aggregate a considerable total.

Boston—Tank and boiler fabricators are still taking considerable tonnage of plates. Not all producers have officially announced first quarter prices, but it is expected that other mills will follow a Pittsburgh producer's $3 advance. Delivery time is well forward on flanged material, and a week to 10 days on plain plates.

New York—While plate sellers are still accepting tonnage at fourth quarter prices they are becoming increasingly discriminatory as demand expands. More than 25,000 tons of miscellaneous oil refinery work has been placed under protection within the past few days and car and locomotive requirements are mounting rapidly. Producers are limiting restrictions on identified work, making the limit for specifications on cars and locomotives March 31. United Dry Docks Inc., New York, has booked three sludge barges for New York. Newport News Ship Building & Dry Dock Co. and United Dry Docks Inc. will close here on steel for two tugboats for the Chesapeake & Ohio.

Philadelphia—Plate tonnage continues to expand although indications are that most eastern producers will accept tonnage at current quarter prices until near the end of December with such shipments as cannot be made before Jan. 1 falling over for delivery at mill convenience. Railroad equipment tonnage is an increasing factor, including approximately 1100 tons for 27 locomotives just placed by the Santa Fe with Baldwin Locomotive Works.

Seattle—One of the year's largest tonnages is involved in the Everett, Wash., pipe line extension, bids called for Dec. 16. Estimated plate requirements total 8500 tons. Specifications call for 30, 36, 48 and 52-inch pipe, of ¼ to 7/16-inch plates. Alternate figures will be received for one section of 52-inch centrifugally spun concrete. Figures will likely be based on rail shipment of material, which averages $10 a ton more than by water.

Contracts Placed

4000 tons, 25 standard steel coal barges, all welded, for Vesta Coal Co., to Jones & Laughlin Steel Corp., Pittsburgh.

850 tons, 19 tanks, Barrett Co., Malden, Mass., to Chicago Bridge & Iron Works, Chicago.

175 tons, Cedar River power project, Seattle, to Western Engineering Corp., Seattle.

170 tons, pipe line for University Mound reservoir, San Francisco, to Western Pipe & Steel Co., San Francisco.

145 tons, six oil storage tanks, Hastings, N. Y., for A. P. Milligan to Hammond Iron Works, Warren, Pa.

100 tons, tank, Portland, Me., to Chicago Bridge & Iron Works, Chicago.

100 tons, tank, Bangor, Me., to Chicago Bridge & Iron Works, Chicago.

Contracts Pending

42,300 tons, floating drydock, Pearl Harbor, Hawaii, designated as "ARD-3";

THE CHARGE OF THE CUPOLA BRIGADE!

"Theirs not to reason why"—if you want to pay men with wheelbarrows to charge a cupola, there's nothing in the world to stop you. But it will cost you plenty. So will some of the other old-fashioned methods.

A P&H cupola-charging hoist can do more work and cost you far less. As a trailing cage unit, for example, with motor-driven trolley, this installation is fast, efficient and economical in cupola charging service.

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Safety catches, which ride above I-beam flange, make it impossible to derail this unit should a heavy jolt occur. It's 100% safe.

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P&H ELECTRIC CRANES ELECTRIC HOISTS

bids readvertised for Feb. 3 after refusal of Nov. 25 bid of Bethlehem Steel Co.

8500 tons, Everett, Wash., supply pipe extension, 30 to 52-inch; bids by water board Dec. 16.

4000 tons, steel floating drydock, 446 x 68 feet, specification "ARD-2" for navy department, to be shipped to Pearl Harbor, Hawaii.

235 tons, oil tank barge for Socony-Vacuum Oil Co., for use on the Ohio and Mississippi rivers.

170 tons, 75 to 123-inch welded steel pipe, San Gabriel dam No. 1, Los Angeles; bids Dec. 15.

Sheets

Sheet Prices, Page 90

Pittsburgh—Sheet sellers Dec. 1 generally placed a deadline on receipt of business at the fourth-quarter price and experienced on that day alone the heaviest bookings for any day of 1936. Order books of some mills on Dec. 1 alone reached the proportion of a full month's bookings. An exception is being made to this deadline on material which can be entered at present but which must be rolled and shipped before Jan. 1. Accommodation of this type of business is being made largely at the producer's discretion. Additional to first-quarter price increases noted in these columns last week, are the following, also for effect Jan. 1: Mill run cold-rolled sheets up $4 to 2.70c, Pittsburgh, 10 gage base; hot-rolled sheets pickled in the breakdown up $4 to 2.55c, Pittsburgh, for 10 gage and 3.10c, Pittsburgh, for 24 gage.

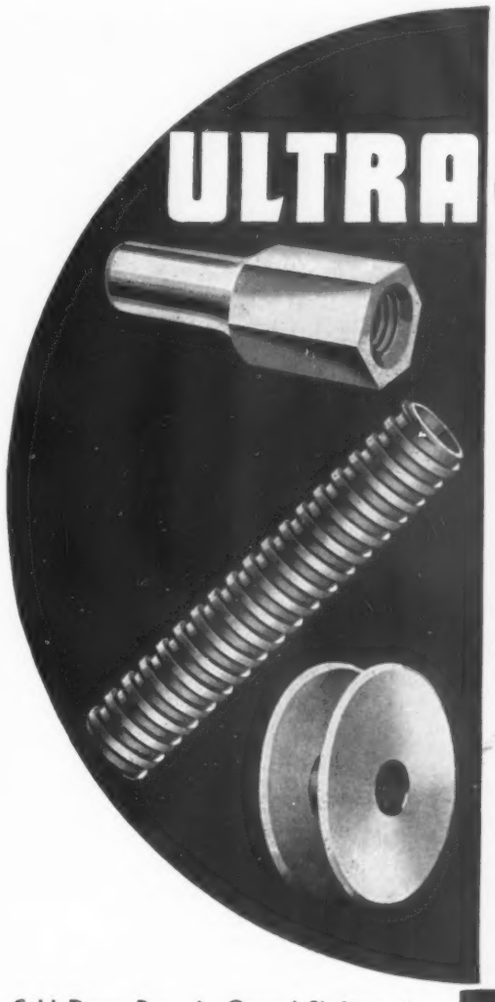
Cleveland — Some mills are out of the market for fourth quarter delivery on lighter gage sheets and are now booking orders at the increased prices. Shipments to the automotive trade continue to improve and no let up is anticipated over the next few months. Cold-rolled sheets, while not extended as much as black sheets, have been in active demand from miscellaneous sources. Requirements for galvanized and enameled sheets continues to hold an active pace.

Chicago—Sheet mills have ceased taking business at fourth quarter prices, because additional tonnages cannot be shipped before Jan. 31. On new business the higher quotations announced recently for first quarter application, amounting to $4 a ton on most grades, are being named.

New York—Leading sheet sellers have withdrawn from the market at old prices. However, some hot-rolled products are still available. With respect to identified work one sheet seller is allowing a 30-day protection period with deliveries to be made during the life of the job. This is no change from previous practice but differs somewhat from schedules now being announced by platemakers for railroad equipment work inasmuch as the latter restricts specifications to the end of first quarter with deliveries thereafter at mill convenience. New York state opened bids Dec. 1 on 730 tons of No. 24 gage license tag stock for delivery as required in car lots during first quarter.

Boston—Sheet sales, both in anticipation of the $4 advance for first quarter and for immediate consumption, have been heavy. Sheet sellers generally have indicated that orders taken at fourth quarter prices but which cannot be shipped before the end of the year will be delivered in January.

Philadelphia—Several sheet producers are out of the market at old prices, including a leading eastern seller and the number is expected to increase before the month goes much further. Meantime sheet demand has lost some of its force as an increasing number of consumers



ULTRA-CUT

is gaining hosts of new friends by its amazing machinability in the production of machine parts —more pieces per hour, finely finished parts, longer tool life, record low costs—these performances are typical:—

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In machining this hexagon unit, on a 4-spindle automatic, Ultra-Cut increased production 30-35% over SAE 1112, with 30% greater tool life between grindings.

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In fabricating this jack screw, the time per part was reduced from 27 to 16 seconds by substituting Ultra-Cut for the former grade of steel, besides an increase of 70% in tool life.

●

This steel spool was machined at 51 pieces per hour with Ultra-Cut as compared to 36 per hour with SAE 1112—obtaining same tool life and an improved finish.

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Cold Drawn Bars * Ground Shafting * Screw Stock * Special Sections * Alloy Steels * Extra Wide Flats

BETTER MADE STEELS LABORATORY TESTED

BLISS & LAUGHLIN, INC.

HARVEY, ILL. *Sales Offices in all Principal Cities* BUFFALO, N.Y.

gains a certain degree of protection. However, much activity is still noted by sellers able to accept tonnage. Alan Wood Steel Co. puts its second mechanized sheet mill into operation Dec. 7.

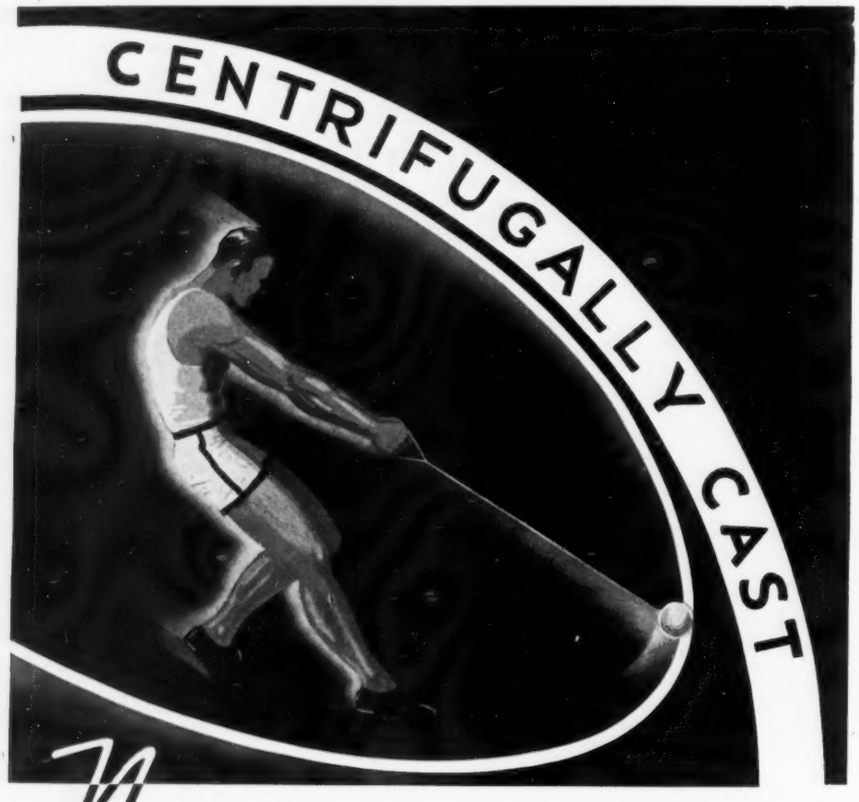
Buffalo—Pressure for delivery of steel sheets for the automotive trades continues heavy in spite of interruptions of production in some assembly lines. Steelmakers here believe these interruptions are not serious and that there will be a heavy demand for automobile sheets through the first four or five months of 1937 and probably for an even longer period. Mills producing automotive material here are operating at rates near their capacity.

Youngstown, O.—Allotting of mill production tonnage has been forced upon valley mills by the sudden huge inflow of specifications insistent upon fourth quarter delivery. This especially is true of sheets. Already it is found to be a physical impossibility for valley mills to follow buyers' desires for quick delivery, and hence mills have begun strictly to parcel out production according to what they believe are actual needs of consumers. Otherwise, they say, their production would be engaged well through the first quarter. Most demand at the moment is for common black sheets but with a fair scattering but growing need for galvanized and tin mill black.

Cincinnati—New orders for sheets have dwindled to fill-in requirements and scattered, small-lot first quarter purchases, as an anticipated sequel to heavy buying before price advances. Bookings were so heavy that carryover tonnages will give strong impetus to production after Jan. 1. Rolling facilities are fully engaged. Pressure on shipments is more pronounced as automotive needs expand.

St. Louis—The announced increase in prices of sheets has stimulated demand and some producers are contemplating allocating tonnage to customers during the remainder of the year in proportion to their former requirements. Warehouse interests for some time have been fortifying stocks, and are in the main well provided for. Tin plate and galvanized sheets continue in active demand, with November shipments the largest for that month in years.

Birmingham, Ala. — There has been no hesitation in sheet manufacture in the Southern territory. Demand continues brisk and indications are for continued activity for an indefinite period. Practically all of the present business is for immediate use.



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ROLLS, SLEEVES, LINERS, BUSHINGS, BEARINGS and CASTINGS produced by this method find their way into the "tough spots" all over the world. Perhaps you have a place or a product that would benefit by their application?

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SHENANGO-PENN MOLD COMPANY

Plant, Dover, Ohio

Executive Offices: Oliver Bldg., Pittsburgh

Transportation

Track Material Prices, Page 91

A major buying wave by railroads has brought the steel industry bookings of more than 400,000 tons of steel rails and about 78,000 tons of track fastenings within the past week, believed to be the largest rail purchase for a single week for many years, if ever.

In addition to heavy rail and fastenings buying, more than 8600 freight cars were placed in addition to 11,000 to be rebuilt in railroad shops; 35 locomotives and two 17-car streamlined trains for service over western roads were awarded and about 15,000 cars are pending. Baltimore & Ohio contemplates the purchase of 1500 gondolas involving two or three different types.

This heavy buying has not cleared the boards and awards are expected at any time on 15 locomotives for the Denver & Rio Grande, 11 for the Western Pacific, 10 to 15 for the Southern Pacific, 10 for the Western Maryland, five for the Seaboard Air

Line and five for the St. Louis Southwestern.

The Pennsylvania is reported planning a survey for electrification of its line from Paoli, Pa., to Harrisburg which may lead to substantial tonnage for transmission towers. The same road has under consideration a comprehensive program for freight car rehabilitation.

Great Northern will spend about $30,000,000 in its 1937 building program, including rebuilding 11,000 freight cars in its own shops, purchase of 500 ore cars, 500 gondolas and 1000 box cars, about 40,000 tons of rails, with fastenings.

The market on cut railroad spikes will be advanced $3 a ton to 2.90c, f.o.b. Pittsburgh, for effect with the first quarter. This compares with the present market of 2.75c, base. A week ago the announcement of higher prices on other track fastenings was made, also for effect with the first quarter. At that time angle splice bars were announced to be advanced $3 a ton to 2.70c, Pittsburgh; tie plates $2 to 2.10c, Pittsburgh; track bolts $5 to 4.00c, and screw spikes $5 to 4.60c, base, Pittsburgh.

Orders for domestic freight cars in November totaled 1550 bringing the total for 11 months to 41,193 compared with 9258 for the similar period of 1935. Other comparisons follow:

	1936	1935	1934	1933
Jan.	2,050	24	152	3
Feb.	6,900	806	19,725	0
March	632	0	30	5
April	4,427	350	800	50
May	8,900	2	717	8
June	5,220	5,151	1,835	500
July	7,229	500	19	306
Aug	225	200	105	202
Sept.	1,750	875	7	23
Oct.	2,210	1,250	75	514
Nov.	1,550	100	254	533
11 mos. ...	41,193	9,258	23,719	2,078
Dec.	.....	10,050	110	316
Total ...		19,308	23,829	2,460

Rail Orders Placed

Atlantic Coast Line, 4000 tons to United States Steel Corp.

Atchison, Topeka & Santa Fe railroad, 155,035 tons of rails and fastenings allocated as follows: Colorado Fuel & Iron Co., Denver, 99,408 tons; Carnegie-Illinois Steel Corp., 33,327 tons; Inland Steel Co., 12,676 tons, and Bethlehem Steel Co., 4963 tons. Balance of 4661 tons, consisting of fastenings only, awarded to several companies. Entire lot of 155,035 tons was divided as follows: 116,918 tons of rails, 26,490 tons of tie plates, 6856 tons of angle bars, 3945 tons of spikes and 828 tons of bolts.

Baltimore & Ohio, 52,000 tons; Carnegie-Illinois Steel Corp., awarded 32,500 tons; Bethlehem Steel Co., 17,500 tons, and Inland Steel Co., 2000 tons.

Chesapeake & Ohio, 37,471 tons; to Carnegie-Illinois Steel Corp., 19,860 tons, Inland Steel Co., 13,115 tons, Bethlehem Steel Co., 4496 tons.

Chicago & Eastern Illinois, 7000 tons to Carnegie-Illinois Steel Corp. and Inland Steel Co., Chicago.

Chicago, Burlington & Quincy, 30,000 tons; 15,000 tons to Colorado Fuel & Iron Co., Denver; 10,000 tons to Carnegie-Illinois Steel Corp., Chicago; 5000 tons to Inland Steel Co., Chicago.

Chicago, Milwaukee, St. Paul & Pacific, 30,000 tons, to Carnegie-Illinois Steel Corp., and Inland Steel Co., Chicago; orders for 32,000 tons of accessories divided among various manufacturers.

Delaware, Lackawanna & Western, 11,000 tons 131-pound rails, 10,000 tons to Bethlehem Steel Co., 1000 tons to United States Steel Corp.; 6175 tons track fastenings to these suppliers and Republic Steel Corp.

Erie railroad, 21,333 tons allocated as follows: Carnegie-Illinois Steel Corp., 16,633 tons; Bethlehem Steel Co., 3000 tons, and Inland Steel Co., 1700 tons.

Missouri Pacific, 33,850 tons; 22,850 tons of 112-pound and 11,000 tons of 90-pound rails, to Colorado Fuel & Iron Co., Carnegie-Illinois Steel Corp., Tennessee Coal, Iron & R. R. Co., Bethlehem Steel Co., and Inland Steel Co.

Nickel Plate, 13,536 tons, to Carnegie-Illinois Steel Corp., 8799 tons, Inland Steel Co., 3113 tons, Bethlehem, 1624 tons.

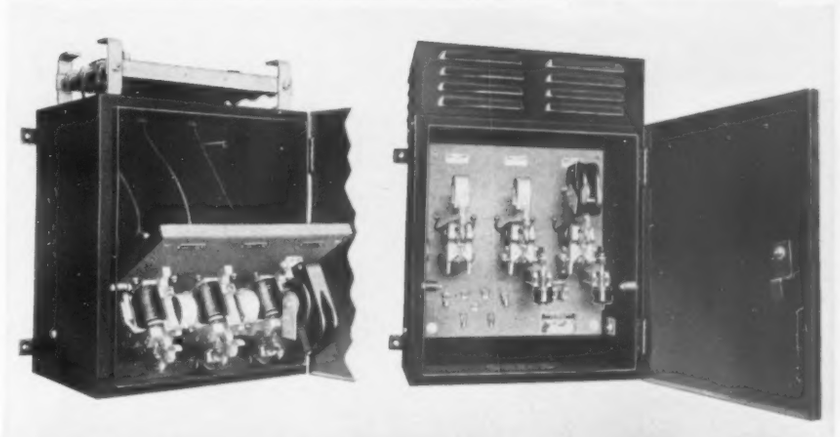
Norfolk & Western, 40,000 tons of 131-pound rails; 30,000 tons to Carnegie-Illinois Steel Corp., and 10,000 tons to Bethlehem Steel Co.

Pere Marquette, 9200 tons; to Carnegie-Illinois Steel Corp., 3330, Inland Steel

NEW EC&M MILL TYPE D. C. STARTER

THE ELECTRIC CONTROLLER & MFG. CO. EC&M CLEVELAND, OHIO

HEAVY DUTY MOTOR CONTROL FOR CRANES, MILL DRIVES AND MACHINERY • BRAKES • LIMIT STOPS • LIFTING MAGNETS AND AUTOMATIC WELD TIMERS



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Designed from the viewpoint of the user, this new starter of outstanding simplicity and accessibility marks another remarkable development by EC&M. The electrical men of industry who have seen this unit have been greatly impressed by the ease with which acceleration time can be adjusted, the accessibility of this adjustment, the selection of the resistors to meet these horsepower requirements and the method of completely exposing all connections.

When used with adjustable speed motors, field acceleration, field failure relays, etc. can be made a part of this unit. Main line knife switch, overload relays and similar features can also be added where desired. Write for full details.

Compact, self-contained unit—for wall mounting.

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Panel swings forward, making all parts accessible.

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New Type RD Mercury-type Acceleration Relays—quickly adjustable for ½ to 2 seconds per acceleration step.

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Reconnection of resistors only requirement to meet wide horsepower range.

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Main Line Contactor of LINE-ARC design, giving scientific control of the arc.

The ELECTRIC CONTROLLER and MFG. CO., CLEVELAND, OHIO

Co., 3182, Bethlehem Steel Co., 888 tons, Algoma Steel Corp., 1800 tons.

San Francisco-Oakland Bridge Commission, San Francisco, 3075 tons rails, 1155 tons fastenings, as follows: 2575 tons to Bethlehem Steel Co., 500 tons to Columbia Steel Corp.; 375 tons spikes and bolts to Bethlehem and 780 tons tie plates to Columbia Steel Corp.

Car Orders Placed

Atchison, Topeka & Santa Fe, 1500 box cars to Pullman-Standard Car Mfg. Co.; 700 refrigerator cars to General American Transportation Co.; 500 box cars to American Car & Foundry Co., and 325 gondolas to General American Transportation Co.

Great Northern 11,000 freight cars to be rebuilt, to own shops.

Montour railroad, 500 hoppers to Pullman-Standard Car Mfg. Co., Chicago.

Norfolk & Western, 1000 cars, 500 hoppers and 500 gondolas, to own shops.

Pacific Fruit Express, San Francisco, 2000 refrigerator cars, 500 each to Pacific Car & Foundry Co., Pullman-Standard Car Mfg. Co., American Car & Foundry Co., and General American Car Co.

Seaboard Air Line, 1000 box cars to Pullman-Standard Car Mfg. Co., Chicago.

Southern Pacific, Chicago & North Western and Union Pacific, jointly, two 17-car, 5400-horsepower, diesel-electric driven, streamlined trains to Pullman-Standard Car Mfg. Co., Chicago, and Electro-Motive Corp., La Grange, Ill.

Western Pacific, 100 ballast cars to American Car & Foundry Co.; 500 flats to Pacific Car & Foundry Co.

Locomotives Placed

Atchison, Topeka & Santa Fe, 27 steam locomotives, to Baldwin Locomotive Works, Eddystone, Pa.

Norfolk & Western, eight high-speed freight locomotives, to own shops.

Car Orders Pending

Bangor & Aroostook, five deluxe coaches and two baggage-mail cars.

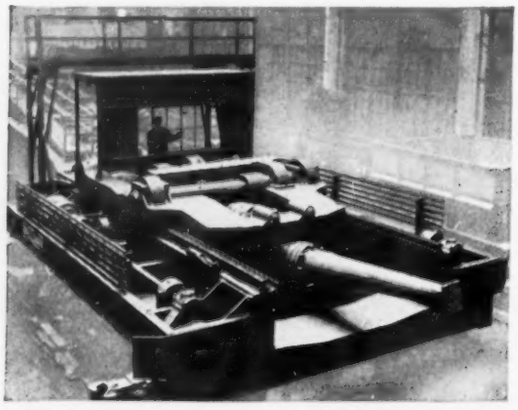
Chesapeake & Ohio, fifty 40-ton stock cars; twenty-five 70-ton dry bulk cars; 10 all-steel horse express cars; fifty 30-ton steel frame cabooses.

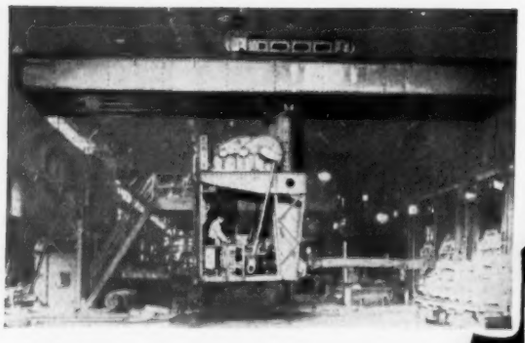
Great Northern, 1000 box cars, 500 ore cars, 500 gondolas, 12 coaches.

Southern Pacific, 1750 box, 500 large automobile and 250 small automobile cars.

Rail Orders Pending

Wabash, 15,000 tons, 112-pound, and fastenings; first quarter delivery; court permission given.





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ENGINEERS CONSTRUCTORS MANUFACTURERS
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BIRMINGHAM • NEW YORK • MEXICO CITY

Pipe

Pipe Prices, Page 91

Pittsburgh—Humble Oil & Refining Co., Houston, Tex., has placed an order for 12,000 tons of steel pipe with National Tube Co., Pittsburgh, for a 120-mile pipe line. A prospective tonnage for early 1937 has been announced by the Panhandle Eastern Pipe Line Co., New York, which states its construction program contemplates building of loops to the present transmission lines in Detroit. Construction of the 9000-ton, 92-mile pipe line of the Cabot Gas Corp. from western Pennsylvania to Rochester, N. Y., was authorized by the public service commission of New York state Nov. 28.

Cleveland — Prices on tubular products have been definitely announced as unchanged for fourth quarter. Some jobbers report a slight decline in total sales during November, but some improvement has been noted so far this month. Domestic requirements for steel pipe continue to show the decline noted a few weeks ago. The market for fixtures remains comparatively active. No cast iron pipe projects were awarded last week, but considerable tonnage is anticipated over the remainder of the quarter.

Chicago—Cast pipe for local delivery has been advanced $2 a ton. Class B material now is $49.40 to $50.40, delivered, for 6 to 24-inch sizes, and $52.40 to $53.40 for 4-inch material. Standard fittings continue $100, Birmingham. This is the first change since April, 1935, and re-

flects the recent pig iron advance. Pipe now is quoted at the highest level since early 1926. Demand is declining more rapidly and shipments reflect the approaching curtailment of pipe installations during the winter.

Boston—A $2 advance in the base price of cast pipe of 6-inch sizes and over has become effective, following a similar markup in New York and Birmingham, Ala. A number of projects involving considerable tonnage has been awarded or is pending.

New York—Aside from a few projects requiring from 150 to 500 tons of cast pipe, demand is mostly for carload lots and less. The new prices of $45 for 6-inch and over and $48 for 4-inch and under are considered firm. A number of federal projects still are pending.

Youngstown, O. — Construction wrought pipe demand continues in fair volume for both lap and butt-weld. Oil country goods' requirements are engaging the capacity of the mills, and an occasional tonnage of 8 to 12-inch for gas and oil pipelines is quietly placed.

Birmingham, Ala.—Cast pipe, six inches and over, has been increased $2 per ton, to $41 to $42. Pipe shops are maintaining operating schedules of four and five days a week. Shipments continue steady.

San Francisco—The only cast pipe award of size was placed through the general contractor, Fisher Construction Co., with an unnamed interest and involved 627 tons of 2 to 10-inch pipe for Stafford, Ariz. Fresno, Calif., has just opened bids on 545 tons of 4 to 12-inch, Class 150 pipe.

Seattle—Demand has not improved for cast pipe and dealers anticipate little business until after the holidays. Tenino, Wash., is planning purchase of local water system and intends improvements and replacements, after plans by Parker & Hill, Seattle. Maplewood, Oreg., has received a $21,000 PWA grant and loan for rebuilding the water system.

Cast Pipe Placed

627 tons, 2 to 10-inch, Safford, Ariz., to unnamed interest, general contract to Fisher Construction Co., Los Angeles.
600 tons, water department, Hartford, Conn., to United States Pipe & Foundry Co., Burlington, N. J.
250 tons, water department, Providence, R. I., to Warren Foundry & Pipe Corp., Phillipsburg, N. J.
250 tons, treasury department, procurement divisions in Boston and Manchester, N. H., to Warren Foundry & Pipe Corp., Phillipsburg, N. J.

Steel Pipe Placed

12,000 tons, 120 miles of 10-inch line pipe, gas line from northern Harris county, Texas, to Texas industrial areas at Port Arthur, Beaumont, Houston and Port Neches, Tex., for Humble Oil & Refining Co., Houston, Tex., to National Tube Co., Pittsburgh.

Cast Pipe Pending

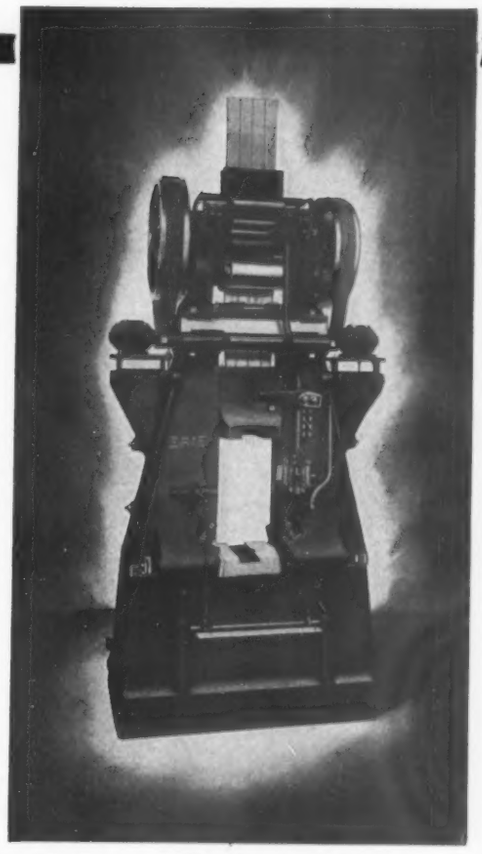
545 tons, 4 to 12-inch, Fresno, Calif.; bids opened.
510 tons, 16 and 20-inch, water department, Southbridge, Mass.; United States Pipe & Foundry Co., Burlington, N. J., low.
500 tons, for Queens, N. Y.; bids Dec. 11 by department of purchases, New York City.
450 tons, water department, Swanton, Vt.; bids taken Nov. 30.
150 tons, Convent avenue, Manhattan borough, New York, on contractors' bids through water supply department, New York.
100 tons, water department, Rockland, Mass.; bids taken Dec. 2.
Unstated tonnage, Richmond, N. Y.; four $100,000 projects involved.

Strip

Strip Prices, Page 91

Pittsburgh—Most sellers by last week had announced a $5 a ton increase on cold-rolled strip steel, effective on shipments after Jan.

You Are The Man On a Bicycle



You are going to fall if you don't keep going ahead. During the last few years the drop forging industry has, of necessity, done some remarkable feats of trick riding. It has been a fine, praiseworthy performance. But now the course opens out ahead, and you can't even keep your balance, let alone keep in the race, unless you keep moving forward.

For six years now more hammers have worn out than have been replaced. That's one reason why your deliveries are not what your customers would like. Very definitely it would be good economy to scrap 30% of the hammers now in use. That's one reason why you can't meet the prices of a competitor who has installed modern ERIE Forge Shop Equipment.

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ERIE

1, which will advance the market from the present 2.60c, base, to 2.85c, base, Pittsburgh or Cleveland. A $4 a ton increase on commodity and lamp stock will be made at the same time, which will quote the former 3.50c, base, Pittsburgh, for 20 gage and 3.10c for 14 gage. Lamp stock will be advanced from 3.40c to 3.60c, base, Pittsburgh, for 20 gage. From all present indications prices on stainless steel strip will be announced unchanged for first quarter. Meanwhile, advance buying in strip steel has reached new high levels for buyers of both hot and cold-rolled have been entering specifications freely to escape the price increases. Hot-rolled strip on Jan. 1 becomes quotable $5 a ton higher at 2.20c, Pittsburgh.

Cleveland — Producers report a rather marked increase in demand, because of the recent adjustment in prices. At present the effective date of the change varies with individual producers, causing confusion. Those who are already well booked are inclined to take advantage of the higher price levels by only accepting tonnage on which they can make deliveries early next month. Those not so well situated are accepting all the tonnage on which they can make delivery some time during January.

Greer Steel Co., Dover, O., has advanced cold-rolled strip steel $5 per ton and commodity and lamp steel $4 per ton, effective Dec. 1. This makes the Greer price on cold-rolled strip 2.85c, base, Pittsburgh or Cleveland, lamp steel 3.60c, base, and commodity steel 3.50c for light and 3.10c for heavy gages.

Chicago—Strip mills are heavily booked and are assured of active operations during the next 60 days. In some instances mills find it necessary to decline additional tonnages due to inability to make delivery by the end of January. On first quarter business, producers are quoting 2.25c, base, for hot-rolled strip, while cold-rolled strip also has been advanced $5 a ton to 2.85c, Pittsburgh-Cleveland.

Boston—Heavy buying of both cold-rolled and hot-rolled strip which has been going on for several weeks was augmented last week by considerable anticipatory purchasing against the $5 mill advance for first quarter. Some mills are reported to be practically out of December tonnage, but indicate that January delivery may be made on orders at fourth quarter prices.

Philadelphia—Business in narrow strip continues to reflect the stimulation of higher prices for first quarter with the advance in cold-rolled as well as hot-rolled established at $5 per ton.

Youngstown, O.—Strip steel consumers are making a determined rush upon valley mills to get place on rolling schedules for all possible tonnage for fourth quarter delivery. As a result, mills are allotting production, based upon usual requirements.

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Wire

Wire Prices, Page 91

Pittsburgh—Through the past week sellers of wire products have declined to accept any more business at the fourth-quarter price and on spot tonnage not covered before Dec. 1 they are naming the advanced market of $3 to $4 a ton. Quotably the market on wire products is now at the higher asking price, but admittedly a test is not likely to develop until about the middle of January, when orders are completed against the advance buying of late November. For all fresh buying the market is therefore now quotable $2.25 per keg, f.o.b. Pittsburgh or Cleveland on nails, plain wire, 2.60c, spring wire,

3.20c, and woven wire fencing, $63.

Cleveland—Producers report considerable forward buying, resulting from the recent price adjustments. Because of extended delivery conditions, at least one producer has stopped booking orders at the old prices. Manufacturing wire is most active here, with nut and bolt concerns taking the largest individual tonnages. Auto partsmakers are also heavy consumers and there is ample cause to believe that the present trend will continue to improve.

Chicago—Wire producers have sufficient backlogs to support active operations through December. Recent price advances served to stimulate forward buying, though in the case of some distributors of merchant products, financial conditions will prevent accumulation of extensive stocks. Higher prices ranging from $2 to $4 a ton are being quoted on new business.

Boston—Wire sales last week took another upswing as consumers moved to protect themselves against reported price advances. It is understood that wire rods have been advanced $3 and manufacturers' wire $2 a ton, for first quarter delivery on orders placed after Dec. 1. The buying preceding this reported advance is not as strong as before the increase in September, reflecting the well-covered position of many consumers.

Youngstown, O.—Wiremakers admit that the new price schedule has not ironed out all the inequities of the old schedule as between nails and plain wire, but at this time they cannot figure out what to do about it. Export demand has picked up, especially to South America, since European supplies have dried up and export prices have risen by $6 to $8 a ton recently.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 91

Effective at once manufacturers of large rivets have advanced prices $4 per ton, to a basis of 3.25c, Cleveland and Pittsburgh, and 3.35c, Chicag and Birmingham, Ala. Prices of small rivets have not been changed.

An advance of approximately 10 per cent has been made on most descriptions of bolts and nuts, effective on current business and for first quarter. This brings large carriage and machine bolts to 65 and 10 off and smaller to 70 off list.

Improved activity in railroad equipment buying enhances the outlook for bolt, nut and rivet consumption. Production of farm implements and tractors has been well maintained, with gains scheduled for coming months. Structural fabricators are taking smaller lots of rivets, this being a seasonal trend. Miscellaneous users of bolts, nuts and rivets are accounting for a steady flow of orders. Aggregate business compares favorably with that a month ago.

Cold Finished

Cold Finished Prices, Page 91

Pittsburgh—An advance of $4 a ton in cold-finished alloy quality steel bars to 3.25c, base, Pittsburgh, Gary, Cleveland, Chicago and Buffalo, has been announced for effect with the first quarter and is similar to the previously made announcement of a $4 per ton increase in cold-finished carbon steel bars, which will be quoted 2.55c, base, Pittsburgh. Buyers of these products have been entering sizable tonnage over the past week to avoid application of the higher prices, which are not expected to carry significant test until after Jan. 1.

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Normalizing • Annealing • Drawing

THE illustration shows one unit of an installation of three Gas Machinery Company Car Type Furnaces with heating chambers 8′ x 16′ x 4′ for normalizing, annealing and drawing of carbon steel and alloy steel castings. • Proper furnace design permits this flexibility without sacrificing accuracy of control or operating economy and since each furnace can be used for all three operations, the installation assures maximum production capacity. • The Gas Machinery Company are designers and manufacturers of furnaces built to meet specific requirements for the heat treatment of steel and nonferrous metals, and for heating preparatory to forging and rolling. • Consult us with your heat treating problems. Our Engineers will be glad to be of service without obligation.

The Gas Machinery Company

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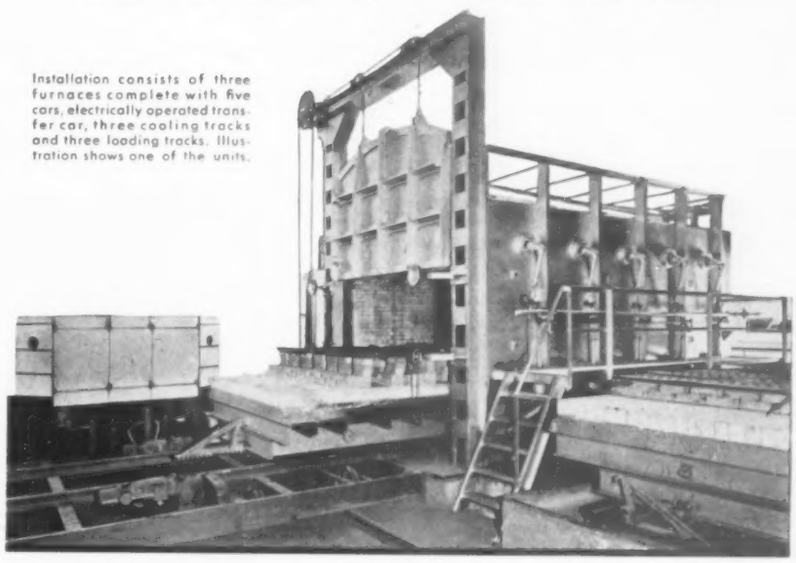

Installation consists of three furnaces complete with five cars, electrically operated transfer car, three cooling tracks and three loading tracks. Illustration shows one of the units.

Shipment Limit Is Clarified

Carnegie-Illinois Steel Corp., Pittsburgh and Chicago, makes the following announcement:

"Carnegie-Illinois Steel Corp. district sales offices are advised that all products which were sold at fourth quarter prices for shipment at mills' convenience must be shipped complete by Dec. 31 or as soon thereafter as operating schedules will permit.

"It is realized on some commodities requiring finishing operations beyond actual rolling it will be impossible to set a definite completing date but on such commodities shipment must be completed by Jan. 31 at the latest.

"Tonnage which cannot be completed by Jan. 31 will on and after Feb. 1 be billed at the newly announced prices for the first quarter."

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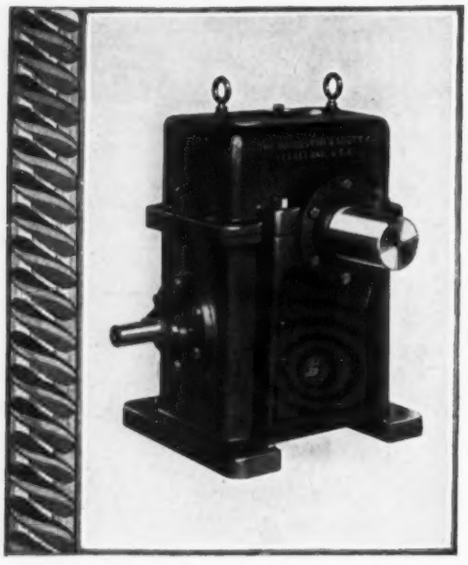

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Shapes

Structural Shape Prices, Page 90

New York—New tonnages on inquiry, amounting to nearly 12,000 tons, overshadow the awards announced last week. To a certain extent the $3 advance effective during first quarter is credited for this increased activity, with indications that still more projects will be out for figuring this week. A larger number than usual of the new inquiries are from private sources, but public work still predominates.

Shipments of fabricated steel, according to the American Institute of Steel Construction, were 23 per cent larger in the first ten months of 1936 than for the entire year, 1935. October shipments were the largest of the year except during June and July, thus escaping the usual fall decline.

Pittsburgh—The approaching $3 a ton increase in plain structural material is hastening many specific building projects that are attempting to get coverage at the lower market through January. Last week Blaw-Knox Co., Blawnox, Pa., took a contract for 2000 tons in transmission towers for the Pennsylvania Water & Power Co. and a 2550-ton viaduct at Cincinnati was awarded to Bethlehem Steel Co.

Cleveland — Fabricators are being asked to do the almost impossible in making hurried estimates from unfinished drawings, furnished by customers who are anxious to have their jobs bid upon and awarded before the first of the year. Numerous small jobs were awarded last week and among the pending, the recent inquiry of 16,000 tons for the strip-sheet mill to be built in Cleveland for Republic Steel Corp., has attracted much interest. Lackawanna Steel Construction Corp., Buffalo, was awarded the only contract let last week a mill building at Youngstown, O., for Republic Steel Corp., Cleveland, involving 800 tons.

Chicago—Some gain is noted in bookings of plain shapes, but the

Shape Awards Compared

	Tons
Week ended Dec. 4	17,132
Week ended Nov. 27	16,860
Week ended Nov. 20	11,146
This week, 1935	23,335
Weekly average, 1935	17,081
Weekly average, 1936	21,703
Weekly average, October	16,068
Total to date, 1935	827,505
Total to date, 1936	1,063,459

fact that pending business in fabricated material is relatively light prevents a more substantial gain in orders. Mississippi river dam No. 13 is out for bids and will take 5500 tons of plates, shapes and piling. Inquiries will appear next quarter on three additional dams.

Boston — With awards totaling more than 3500 tons last week, and several thousand tons pending structural fabricators expect higher activity than for some weeks. Impetus will be given to projects nearing the bidding stage, by the $3 advance for first quarter delivery. The Liberty Mutual building, 2275 tons, has been awarded to American Bridge Co., Pittsburgh. The 11-story New England Power building, which was begun in 1929, is now under construction again with 1200 tons of shapes fabricated eight years ago for this job being used.

Philadelphia — While orders still lag, the outlook is more promising. Bids will be taken Dec. 21 on the superstructure of a toll bridge at Easton, Pa., requiring 4200 tons. The long pending courthouse, this city, may be up within a month, involving at least 5000 tons. Two schools, this city, are also expected to come up for figures this month.

San Francisco—New inquiries are slow in coming forth and most fabricating plants face a serious shortage of material due to the maritime strike. Awards aggregated 13,058 tons and brought the total for the year to 165,428 tons, compared with 113,474 tons for the corresponding period in 1935.

Seattle—New projects are confined to unimportant jobs with small tonnages involved. However, local fabricating plants are reasonably busy although handicapped by lack of materials because of the maritime strike.

Shape Contracts Placed

2550 tons, Columbia avenue viaduct, Cincinnati, to Bethlehem Steel Co., Bethlehem, Pa.

2265 tons, building, Liberty Mutual Insurance Co., Boston, to American Bridge Co., Pittsburgh, through Turner Construction Co., Boston.

2000 tons, transmission towers, for Pennsylvania Water & Power Co., Baltimore, to Blaw-Knox Co., Blawnox, Pa.

900 tons, bridge, Lafayette, Ind., to Vincennes Bridge Co., Vincennes, Ind.

800 tons, mill building, Youngstown, O., for Republic Steel Corp., Cleveland, to Lackawanna Steel Construction Co., Buffalo.

670 tons, service bridge, dam No. 12, Bellevue, Iowa, to American Bridge Co., Pittsburgh.

650 tons, Kress store, Birmingham, Ala., to Ingalls Iron Works Co., Birmingham.

530 tons, state highway project, 320-B, Conway, S. C., to Phoenix Bridge Co., Phoenixville, Pa.

400 tons, bridge, Crowley county, Kansas, to Bethlehem Steel Co., Bethlehem, Pa.

400 tons, state highway bridge, route 52, Ferndale, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

400 tons, Wendell Phillips school, Chicago, to Eggers Iron Co., Chicago.

350 tons, plant addition, for a canning company, Bridgeton, N. J., to American Fabricated Steel Co., Philadelphia.

350 tons, plant addition, Hinde & Dauch Paper Co., Gloucester, N. J., to Belmont Iron Works, Philadelphia.

300 tons, cotton warehouse, Columbus, Ga., to Ingalls Iron Works, Birmingham, Ala.

295 tons, overpass, Atlantic Coast Line and Seaboard Air Line, in Florida, to Virginia Bridge & Iron Co., Roanoke, Va.

280 tons, bridge over Sabine river, Ruliff, Tex., for Kansas City Southern railway, to American Bridge Co., Pittsburgh.

275 tons, school, Garden City, N. Y., to Drier Iron Works Inc., New York.

251 tons, crossing at Deming, Luna county, New Mexico, to unnamed interest.

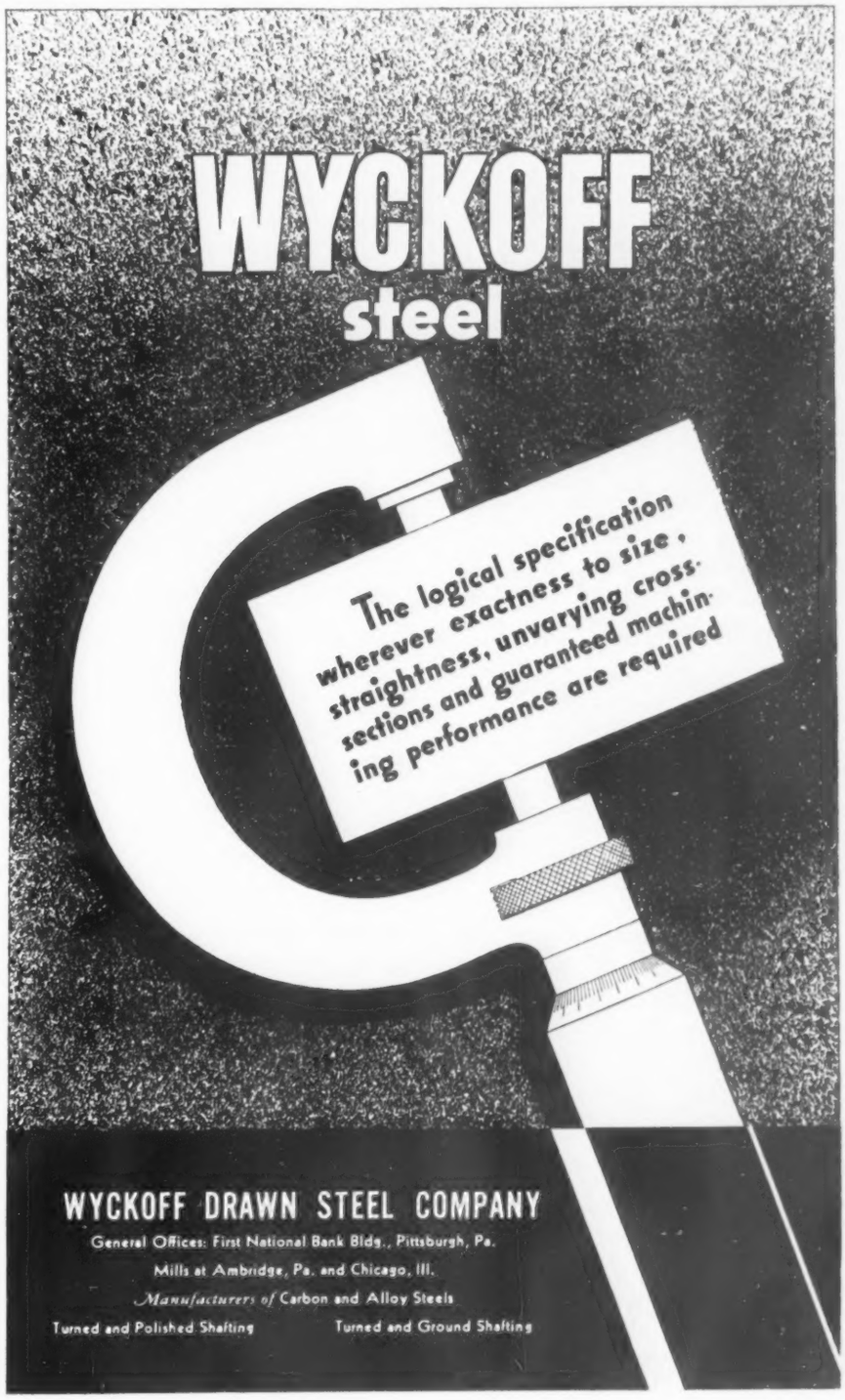
250 tons, bridge, Sugar Grove, Ill., to Worden-Allen Co., Milwaukee.

250 tons, including piling for Bonneville project coffer dam, to Pacific Car & Foundry Co., Seattle; Columbia Construction Co., Bonneville, Wash., general contractor.

245 tons, grade crossing elimination, New York Central railroad, Weedsport, N. Y., to American Bridge Co., Pittsburgh.

220 tons, bridge over New York, New Haven & Hartford railroad, North Haven, Conn., to Bethlehem Steel Co., Bethlehem, Pa.

210 tons, Boco dam on Little Truckee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River, Nev., to unnamed interest.

205 tons, multiple span bridge, Pocahontas county, Iowa, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

204 tons, including 73 tons of piling, bridge in Crowley county, Colorado, to unnamed interest.

200 tons, state bridge, Tioga county, Pennsylvania, to American Bridge Co., Pittsburgh.

177 tons, bridge, Bartlett, N. H., to American Bridge Co., Pittsburgh, through Hagan-Thibodeau Construction Co., Wolfborough, N. H.

170 tons, two bridges, Warner-Cutton, N. H., to American Bridge Co., Pittsburgh, through Arborio Road Co., Hartford, Conn.

170 tons, eleven cleaning tables, Union Carbide Co., Alloy, W. Va., to Lackawanna Steel Construction Corp., Buffalo.

165 tons, Eye & Ear Infirmary, Bronx, N. Y., to Joseph T. Ryerson & Sons Inc., Chicago.

156 tons, state highway bridge WPGH-62-C, Fairfield, Conn., to American Bridge Co., Pittsburgh, through Mariam Construction Co., New Haven, Conn.

155 tons, administration building, Elmira, N. Y., to Genesee Bridge Co., Rochester, N. Y.

155 tons, bridge, B1 of 66-8-12, Ewen-Ontonagon county, Michigan, to Warden Allen Co., Milwaukee.

150 tons, Manhattan ventilation shaft, to Transit Construction Co., New York.

125 tons, theater, Princeton, N. J., to Bethlehem Fabricators, Bethlehem, Pa.

119 tons, sheet piling, bureau of reclamation, invitation A-42,116-A, Knob, Calif., to Bethlehem Steel Co., Bethlehem, Pa.

115 tons, turbine foundation, Fairmont, W. Va., to Fort Pitt Bridge Works, Pittsburgh.

113 tons, sheet piling, bureau of reclamation, invitation A-42,117-A, Knob, Calif., to Bethlehem Steel Co., Bethlehem, Pa.

112 tons, bridge, Milbury-Sutton, Mass., to American Bridge Co., Pittsburgh, through New Haven Road Construction Co., New Haven, Conn.

100 tons, school, Anders, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, bridge, over Boston & Albany railroad, Grafton-Shrewsbury, Mass., to American Bridge Co., Pittsburgh, through Carlo Bianchi & Co., Inc., Framingham, Mass.

Behind the Scenes with STEEL

Hello Again

THIS department has returned from a brief vacation (5 days) spent in Bermuda, Miami Beach, Banff, Lake Louise and other pleasure spots. In our absence the work of grinding out these lines was left in other more capable hands and we trust everything went off satisfactorily. But we're back now, well bronzed by the tropical sun and eager to take the bit in well-riddled molars.

* * *

Shopper's Aid

ONLY 14 more shopping days until Christmas, the department stores tell us, so here we are right handy with a suggestion for What-Shall-I-Give-To-That-Guy problem.

Perhaps he is a young blade, filled with vigor to achieve great things in a reborn industrial world. Perhaps he is a Tau Beta Pi, a whiz at campus politics, and an A-Student, but a little weak on his production, processing, distribution and use of steel and other metals. Perhaps he is your nephew, your son, a favorite protege, or just an earnest youngster who has attracted your attention.

Without using up any more "perhapses," what we're getting at is just this: Why not encourage his business progress, help him to be well informed, by means of a Christmas-gift subscription to STEEL? A gift which each Monday morning will recall to him your generosity and thoughtfulness this Christmas of 1936.

Send us his name and address. We will notify your giftee with an appropriate Christmas card (tinsel, holly, reindeer and all that), and start his subscription with STEEL'S mammoth Yearbook of Industry issue, out Jan. 4. Never mind about the money. We'll send you a bill to worry over later.

We made a dandy suggestion for lines on the Christmas card, but it was turned down coldly by our circulation department. Went like this:

"Please Christmas joy in your heart feel;
From Uncle Joe—a sub to STEEL."

* * *

Fourteen Gods, Goddesses

ONE of the Burlington's new Twin Zephyrs coasted into the Cleveland terminal the other day, so we barged down to look it over, inasmuch as it is entirely sheathed, trimmed and decorated in some very fine stainless steel, shotwelded together by the Budd people in Philadelphia.

The new train is twice as long and powerful as the original Zephyrs, comprising parlor-lounge, parlor, diner, two coaches, cocktail lounge and power cars. The Burlington seems to have gone ecstatic over the new jobs and dubs them "Trains of the Gods", even going so far as to have names painted on the sides of the cars to fit in with this idea. The power cars are, respectively, Zephyrus and Pegasus; the cocktail cars Apollo and Venus; and the others including Neptune, Vesta, Mars, Minerva, Vulcan, Ceres, Mercury, Diana, Jupiter and Juno.

Going into service shortly on the Chicago-Minneapolis run, the 1000-horsepower speedsters will average over 66 miles an hour for 882 miles, sometimes getting up in the neighborhood of 122 miles per hour (that's when we'll sit down).

We stepped into Venus for a Daiquiri, but one of the uniformed police which seemed to infest the train said the bartender was back in Vulcan having a hamburger. Zephyrus was missing on the train too; maybe out to lunch. The guards wouldn't even let us try one of Diana's beautiful seats, but we probably would have fallen asleep anyway, so, striding out through Jupiter's stainless steel door over an articulated truck, we came away, considerably impressed by this latest achievement in making railroad travel comfortable and appealing.

* * *

Readers Rampant

RECENT article in the Surface Treatment and Finishing of Metals department, telling of a new development for brush electroplating worked many readers up into a lather. No sooner had the Monday morning copies of STEEL been opened than the telephone of the New York company sponsoring the development began ringing with requests for copies of the article and more information.

In a flash they wired our Readers' Service department for 5000 reprints. Zip—and the reprints were on the press. Wham—and another request for 2000 reprints came in. Zowie—and a reply went out to the latter inquirer. Whoosh—whose next?

SHRDLU

Shape Contracts Pending

16,000 tons, continuous strip-sheet mill buildings, for Republic Steel Corp., Cleveland; bids close Dec. 7.

5500 tons, Mississippi river dam No. 13, Clinton, Iowa; bids to United States engineers, Rock Island, Ill., Jan. 5; includes 2200 tons of permanent piling.

5000 tons, city hall, Boston, Mass.

3000 tons, bridge over Connecticut river, North Hampton-Hadley Mass.

2500 tons, Apex building, for United States treasury department, Washington.

2000 tons, piling, dam, Mobile, Ala.

1750 tons, steel piling, Flushing meadow, New York; bids Dec. 22 by the New York highway department at Albany, N. Y.

1600 tons, steel piling, for New York regional market authority at Syracuse, N. Y.; bids Dec. 23.

1500 tons, bridge, over approach to World's Fair, New York City; bids Dec. 18 by New York state highway department.

1275 tons, bridge over Grand Central Parkway, New York; bids Dec. 11 by New York state highway department.

1125 tons, grade crossing elimination, Little Falls, N. Y.; bids Dec. 11 by New York state highway department.

1000 tons, building, Miller Brewing Co., Milwaukee.

700 tons, building, for L. A. Young Spring & Wire Co., Trenton, N. J.

700 tons, state bridges, Missouri.

600 tons, bridge reconstruction, New York; Murphy & Richmond, New York low.

600 tons, addition, Louisville Gas & Electric Co., Louisville, Ky.

600 tons, factory building, Medina, N. Y., for H. J. Heinz Co., Pittsburgh.

575 tons, building extension, for Span-Chalfant & Co., Ambridge, Pa.

575 tons, reconstruction of New York Central railroad bridge, Bronx, N. Y.

500 tons, building, National Can Co., Maspeth, Long Island, N. Y.

475 tons, garage, for Rubsam & Horrman Brewing Co., Stapleton, N. Y.

400 tons, asphalt plant, City of New York; new bids Dec. 11.

400 tons, crane runway, Philadelphia Navy yard; Lehigh Structural Co., Allentown, Pa.

400 tons, bridge, on site to World's Fair, New York City; bids Dec. 18 by New York state highway department.

375 tons, department store, for Abraham & Strauss, Brooklyn, N. Y.

350 tons, building, Lever Bros. Co., Cambridge, Mass.; Stone & Webster Inc., Boston, general contractor.

350 tons, two bridges, for Western Maryland railroad, Keymar and Thermont, Md.

300 tons, Central school building, Mexico, N. Y.

260 tons, water works reservoir cover, Henderson, Ky.

250 tons, building, for Procter & Gamble Mfg. Co., New York, at Port Ivory, N. Y.; Kay Construction Co., New York, general contractor.

225 tons, postoffice, West New York, N. J.; Millimet Construction Co., West New York, N. J.

200 tons, repairs for Allegheny county bridge, Glenwood, Pa.; Greenberg Construction Co., Uniontown, Pa., general contractor on Dec. 3 bid.

175 tons, apartment in New York; R. L. Senior Inc., New York, low on general contract.

107 tons, bridge WPSO-R-222 over Whetstone brook, Jamaica, Vt., for highway department; bids due Dec. 11 at Montpelier.

Unstated tonnage, building, Holy Family Hospital, Brooklyn, N. Y.

Unstated tonnage, 8-story building for Commonwealth Ice & Cold Storage Co., Boston; bids Dec. 11.

Unstated, municipal hangar, Billings, Mont.; Leise & Leighland, Great Falls, general contractors.

Reinforcing

Reinforcing Bar Prices, Page 91

Pittsburgh—At least one rail steel reinforcing bar seller has announced a $3 advance for the first quarter. No announcement has yet been received on new billet reinforcing bars. Public awards continue normal, while inquiry of a private nature appears to be declining due to seasonal factors. Producers are expecting a reversal of this trend in the next few weeks.

New York—Reinforcing bar market is quiet, with no large identified lettings and only two inquiries of 100 tons each. The price situation has not been clarified even though the possibility of higher mill prices for the first quarter was in the offing. Most awards were for jobs involving 20 and 30 tons, mostly.

Cleveland — The tonnage of reinforcing bars in northern Ohio for November, on which estimations were made was 107 tons, compared with 759 tons in October. The 600 tons for the sewage disposal contract No. 91, this city, accounts for the big difference. An unusual point in the estimates for November was that the tonnage for steel joists exceeded bars by 43 tons. These joists are to be used extensively in school buildings. Price adjustments for first quarter are expected to be announced next week.

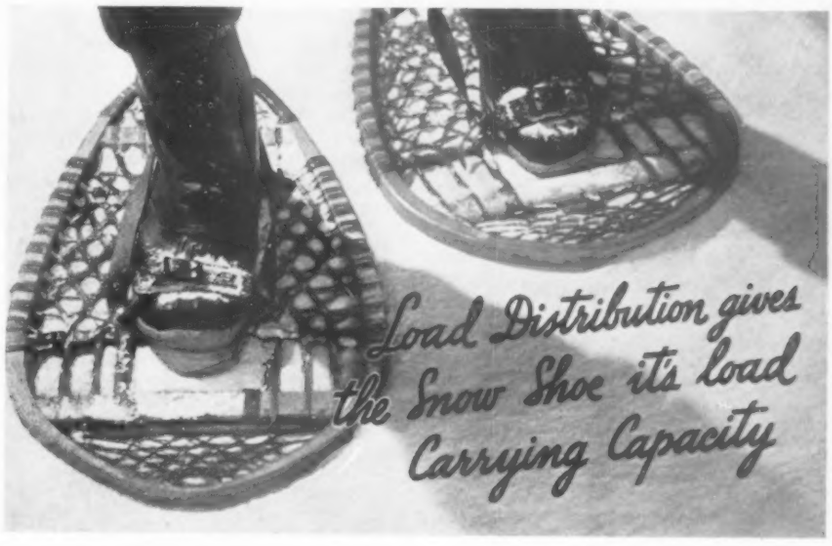
Chicago—New business is holding up surprisingly well for this period. Orders are mostly for small lots, but several large tonnages are to be placed shortly. These include 800 tons each for local sewers and a housing project. The Clinton, Iowa, dam will take 613 tons. Several more river dams will be up for bids early next year. Concrete bar prices are unchanged.

San Francisco—Awards of bars were not particularly heavy and totaled less than 2000 tons, bringing the aggregate for the year to 225,679 tons, compared with 203,223 tons for the same period last year. Unnamed interests took 660 tons for the City & County building, San Diego, Calif.

Boston—Awards of reinforcing bars, especially small tonnages,

Concrete Awards Compared

	Tons
Week ended Dec 4	**2,495**
Week ended Nov. 27	**3,945**
Week ended Nov. 20	**2,706**
This week, 1935	**6,095**
Weekly average, 1935	**6,862**
Weekly average, 1936	**6,133**
Weekly average, October	**3,728**
Total to date, 1935	**339,940**
Total to date, 1936	**300,491**



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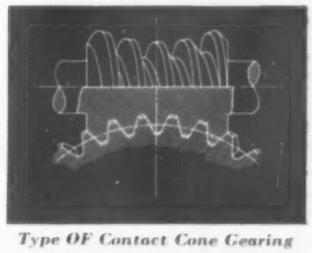
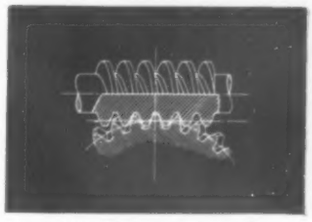


Type OF Contact Cone Gearing



Type OF Contact Conventional Worms

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have been comparatively light for several weeks. Identified awards last week totaled 555 tons, of which 230 is for the New England Power building, Boston. A further decline is expected in keeping with the decline of construction during the winter. Prospects of higher prices are seen, although awards do not indicate much covering.

Seattle—Backlogs are keeping local mills running to capacity during a normally dull season. New projects are small, although aggregated awards of 50 tons or less have mounted into fair tonnages. Week's awards total about 500 tons, booked by the Bethlehem Steel Co., Seattle. Probably 2000 tons are involved in the Salem, Ore., pipe line, American Concrete Steel & Pipe Co., Tacoma, general contractors, and an equal amount in the Oregon state capitol, Salem, awarded to Ross B. Hammond, Portland. Both subcontracts are pending.

Reinforcing Steel Awards

660 tons, City and County building, San Diego, Calif., to unnamed interest.

321 tons, bureau of reclamation, invitation A-42,128-A, Colorado, Calif., to Bethlehem Steel Corp., Bethlehem, Pa.

305 tons, federal buildings at Ketchikan and Sitka, Alaska, to Bethlehem Steel Co., Seattle; Warrack Construction Co., Seattle, general contractor.

260 tons, hospital ward, naval base, San Diego, Calif., to unnamed interest.

230 tons, New England Power building, to Concrete Steel Co., New York.

225 tons, building addition, American Woolen Co., Lawrence, Mass., to Concrete Steel Co., New York; through Chester Patten, Melrose, Mass.

220 tons, addition to American Smelting & Refining Co., Selby, Calif., to Concrete Engineering Co., San Francisco.

129 tons, section E, Alemany boulevard sewer, San Francisco, to Soule Steel Co., San Francisco.

105 tons, bureau of reclamation, invitation A-42,137-A, Potnoles, Calif., to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, overpass, Boston & Albany railroad, Grafton-Shrewsbury, Mass., to Truscon Steel Co., Youngstown, O., through Carlo Bianchi & Co. Inc., Framingham, Mass.

Reinforcing Steel Pending

2000 tons, Oregon state capitol; Ross B. Hammond, Portland, general contractor.

2000 tons, Salem, Oreg.; pipe line improvement; American Concrete Steel & Pipe Co., Tacoma, general contractor.

800 tons, Jane Addams housing project, Chicago; Maurice L. Bein Inc., Chicago, general contractor.

613 tons, Mississippi river dam No. 13, Clinton, Iowa; bids to United States engineers, Rock Island, Ill., Jan. 5.

551 tons, bureau of reclamation, invitation 42,632-A, Phoenix, Ariz.; bids opened.

200 tons, courthouse, Jamaica, N. Y.; bids due Dec. 17.

197 tons, bureau of reclamation, invitation A-42,150-A, Potholes, Calif.; bids opened.

175 tons, bureau of reclamation, invitation A-42,153-A, Potholes, Calif.; bids opened.

116 tons, bureau of reclamation, invitation A-42,151-A, Knob, Calif.; bids opened.

114 tons, bridge, Alexander, N. H.; Bristol Construction Co., Bristol, N. H., general contractor.

109 tons, dam, South Bridge, Mass., for South Bridge Water Supply Co.; J. F. Fitzgerald Contracting Co., Boston, low.

100 tons, apartment for Union City Apartment Corp., Union City, N. J.

100 tons, grade crossing elimination, Hammonton, N. J., for New Jersey state highway department; bids Dec. 14.

100 tons, Castro Canyon bridge, Monterey county, California; bids Dec. 16.

100 tons, dam, Madison county, Montana; bids postponed from Dec. 5 to Dec. 19.

Unstated tonnage, state bridge Powder river, Oreg.; bids at Portland, Dec. 17.

Pig Iron

Pig Iron Prices, Page 92

Pittsburgh—Pig iron sellers at Pittsburgh are disclaiming any likelihood of an additional price advance similar to that announced by a New England furnace of $1.25 a ton last week. Rather, they are content to quote the $1 a ton higher level which went into effect Dec. 1 and which has met some slight test from a few district foundries, one order for about 400 tons at the new price having been closed upon last week.

Cleveland — First quarter prices were announced Dec. 1, a month in advance of their effective date, as was customary under the NRA code. These prices reaffirmed the advances made a week earlier covering such orders placed for delivery throughout the remainder of fourth quarter. One producer reports considerable tonnage has already been placed at the advanced figures, for first quarter delivery. The outlook throughout the remainder of this quarter and the next appears to offer an active market, for consumers' stocks are below average in many cases and their present rate of activity is expected to show continued improvement.

Chicago—Following the heaviest November shipments in eight years, pig iron producers still are heavily booked and expect an equally good record for December. Consumption continues heavy, with the outlook for an extension of active foundry schedules good except for what interruption may result from labor disturbances. The December price of $26.25, delivered Chicago, for Lake Superior charcoal iron has been extended to apply on first quarter business. Silvery iron has been advanced $1.25.

Boston—The second price increase within a month, this time for $1.25 on all grades of pig iron, became effective Dec. 1 on all orders for delivery by Jan. 31. Mystic Iron

Works blew out its furnace Nov. 30, after producing since June 1.

New York—Pig iron specifications are substantial, but new orders are light. Prices generally have been reaffirmed at the $1 advance. The Troy, N. Y., furnace has blown out. Royal Dutch iron has been advanced $1 per ton on all grades, the third advance within six weeks.

Philadelphia—Pig iron sellers have reaffirmed the recent $1 increase for first quarter and while a further increase may be announced after the first of the year, new buying at present is light. Shipments continue to expand, and a Swedeland, Pa., producer is said to be rushing preparations for putting its larger furnace in blast to supplant the one now active. A stack at Emaus, Pa., idle for several years, has recently been sold for dismantling to a Pittsburgh firm.

Japan is reported inquiring in this country for 50,000 tons of pig iron, half basic and half foundry. Last year Japan bought a large tonnage from Russia, which is now shipping heavily to England.

Buffalo—Buffalo merchant interests report covering for the first quarter is now well under way. Consumers are displaying more than average interest in the certainty of deliveries early in the new year. It is expected that all production units now active will be continued in operation throughout the first quarter of 1937.

Youngstown, O.—Consumers of the various grades of pig iron are purchasing liberally at the recently named $1 advance. No. 2 foundry and malleable are in good demand and there is increased requirement for basic iron. No. 2 stack at Hubbard, O., idle for some months, of the Youngstown Sheet & Tube Co. is being dismantled.

Cincinnati—Shipments of pig iron are expanding but the movement is far from volume which would be required to take out all iron under contract. Melters are assuming deliveries after Jan. 1 at the old prices. New prices were paid on scattered carload lots last week, but the bulk of requirements well into the new year are well covered.

St. Louis.—Current pig iron sales have been relatively light, all melters having anticipated needs before the price advance. Sellers are busy getting forward iron under contract. November shipments were the largest for any month this year, and the December movement is expected to equal or exceed its predecessor.

Birmingham, Ala.—At the same time pig iron was increased $1 per ton last week a change was made in the base grade which brings the quotation to $16.88, Birmingham, for No. 2 foundry iron and $15.88 for basic. The base formerly applied to iron containing phosphorus 0.70 or over, with a premium on lower phosphorus. The new base is for iron containing 0.70 or under, with a discount of 38 cents for higher phosphorus. Thus high phosphorus, the grade used by most southern melters, is $15.50, for No. 2 foundry.

Toronto, Ont.—Demand for merchant pig iron continues to follow the trend in other iron and steel markets. Sales are mounting steadily, and awards the past week totaled 1300 tons. Inquiries are appearing and increased forward delivery buying for first quarter is expected. Six blast furnaces are blowing and production has reached the highest level in several years. Prices are firm.

Scrap

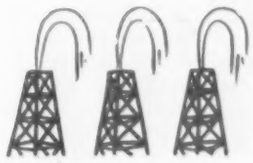
Scrap Prices, Page 93

Pittsburgh—Improved sentiment in remelting scrap since the $17.50 per ton purchases of No. 1 steel here by several district mills two weeks ago has had its effects in the opinions universally held that an $18 market is a strong liklihood before Jan. 1. In view of the fact that no further mill purchases have taken place since the $17.50 commitments, last week found buying brokers willing to pay the same price for coverage, apparently in the belief that short positions are not desirable. Low phos railroad specialties, of which there appears to be a scarcity, seem firm at around $21. Baltimore & Ohio railroad will sell its list Dec. 7, the leading item being 3000 tons of heavy melting steel, 2000 tons of rails and 2000 tons of destroyed steel cars.

Cleveland—Shipments of iron and steel scrap continue going forward in a satisfactory manner. Quotations are unchanged but firm. Restrictions upon the volume of scrap receipts in the Youngstown district, which were laid down several weeks ago, have been lifted in practically every instance except one and partially lifted in this case.

Chicago—Scrap is stronger here and the trade is predicting higher prices. Heavy melting steel is unchanged at $16.25 to $16.75, following a sale of a moderate tonnage at the latter figure. This purchase, however, represents a 25-cent increase over the price paid on a previous sale to this interest. Foundry grades continue strong, with higher prices quoted in some instances.

Boston—Prices are up 25 to 50



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cents a ton on 10 classifications of scrap as both domestic and foreign consumers are coming back into the market for heavier tonnages. Scrap brokers are opposing a proposal of New England freight association to reduce from 10 to five days the free time allowance on railroad cars of scrap shipped to Boston for export or coastwise shipment.

New York—The strong undertone noted for the past two weeks has developed into 25 cents a ton advances on No. 1 heavy melting steel and cast iron borings. Re-entry of Pittsburgh consumers into the market for heavier commitments is giving a still stronger undertone to the market, and scrap is still slow in coming out.

Detroit—Unlike conditions in several nearby markets, scrap here shows a tendency toward lower levels. However, strike conditions in several automobile plants here, which in turn have caused interruptions to production schedules, obviously will cut down on scrap production lists, with the consequent effect of a higher market. Where this is a longer term factor, the greatest cause for price weakness is in the close of the navigation season. For local shipment, f.o.b. consuming point, No. 1 steel remains $13 to $13.50; hydraulic compressed at $13.50 to $14; blast furnace, $9 to $9.50, and machine turnings, $8.25 to $8.75.

Philadelphia—Greater strength is noted in steel and iron scrap with No. 1 heavy melting steel higher at $15 to $15.50, delivered. No important consumer sales have been noted at the outside figure but it is indicated by higher dealer offerings in covering on contract tonnages. No. 2 steel is unchanged. Foreign buying is spotty but indications point to early revival.

Buffalo—Sales of No. 2 heavy melting steel have been made on a liberal scale at the new offer of $15 for this grade for local delivery. Probably more than 5000 tons has been sold to date and more orders may be placed within a few days. The purchaser of this grade has not offered to take No. 1 steel on these contracts. Other grades continue strong in anticipation of early sales.

Cincinnati—Several bullish factors in the iron and steel scrap market induced an increase in dealers' buying prices, although there is a lull in mill buying. Strength is disclosed by the tightness with which material is being held, influenced by increases on finished steel and active production schedules. Current inquiries promise early mill purchases. Foundry grades are moving actively.

St. Louis—Iron and steel scrap continues strong, with available supplies light and further advances of 25 to 50 cents per ton on heavy melting steel and several railroad specialties. Local and outside demand is active, numerous sales of small tonnages being made, with the heaviest purchase 5000 to 6000 tons of heavy melting steel by an East Side mill for delivery over the next 30 days. The price paid by this user was said to be 50 cents per ton higher than the last preceding purchase of the same grade.

Birmingham, Ala.—Consumers of heavy melting steel come into the market at intervals though no large tonnage sales have been announced recently. Quotations for old material remain unchanged.

Seattle—Sustained buying by mills and foundries gives the domestic situation a firm tone although prices in Japan have dropped 75 cents to $1. Stocks in the Orient are reported ample until February in spite of curtailed shipments from this side on account of restricted water services. Shipments out of Vancouver, B. C., are rather heavy, C. T. Takahashi & Co., Seattle, reporting hav-

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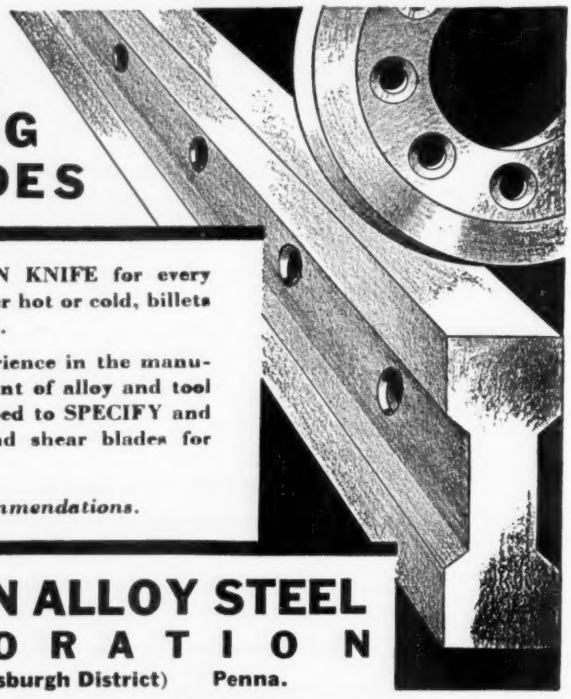

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ing moved 5000 tons this month. Tidewater stocks are low and dealers are buying all desirable offerings. The local price for No. 1 melting is generally maintained at $10.50.

Toronto, Ont.—New business is increasing in iron and steel scrap. Consumers show interest and are placing larger orders for spot delivery, while a number have placed contracts for future delivery. Mills are taking good tonnages of heavy melting steel and other steel grades against contract and other consumers in Ontario and Quebec are inquiring for steel grades.

Warehouse

Warehouse Prices, Page 94

Pittsburgh—Jobbers here have advanced nails for resale out of stock to $2.50 for city delivery, an advance of 25 cents a keg. Advances in black wire, galvanized wire, cut spikes and track bolts are expected to be announced this week. About Dec. 20 an advance in bars, plates, shapes, sheets and other items will be named. Demand continues heavy.

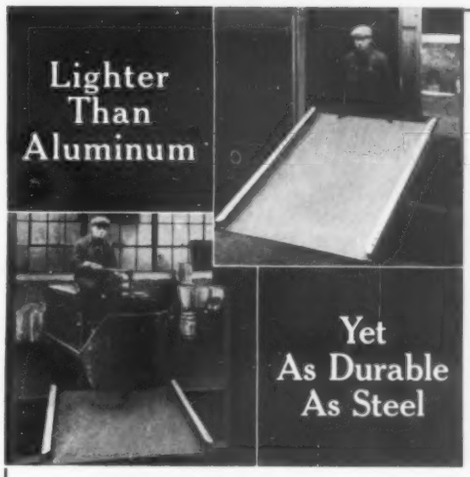
Cleveland — General adjustment in warehouse prices is not anticipated until Dec. 15 and possibly not until Jan. 1. However, it is reported at least one jobber has advanced the price of sheets. Daily average sales during November were slightly below the preceding month, but the reverse is anticipated during December, as a result of general slow delivery conditions. Bars, sheets and wire are more active than the heavier structural products.

Chicago—While warehouses defer announcing price changes, it is anticipated that first quarter quotations will be revised to meet advances effected by mills. November sales were off only slightly from October, and while a more substantial decrease is customary for December, January price increases are likely to stimulate demand late this month.

Boston—Sheets and strip are in strong demand out of warehouse due to some extent from the delayed deliveries from the mills. Other items are moving satisfactorily. Price advances are not expected until the latter part of December.

New York—Warehouse sales are being made at a satisfactory rate. At least one jobber has indicated that cold-rolled strip will be quoted at 3.56c delivered in the metropolitan zone, New York, while another jobber has decided to make no price revisions now.

Detroit—Various interests here have advanced nails 20 cents a keg to $2.60 and have advanced plain wire 10 cents per 100 pounds. Other warehouse prices on finished steel



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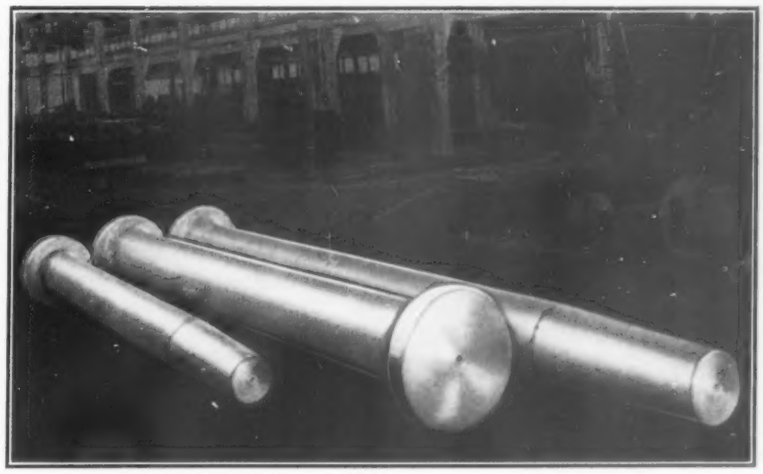

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doubtless will be advanced for effect about Jan. 1, but no announcements have been made yet. Demand continues strong.

Philadelphia—Following a slight decline in November, jobber demand here is likely to undergo a further drop this month, although holding at a better rate than is normal for this season.

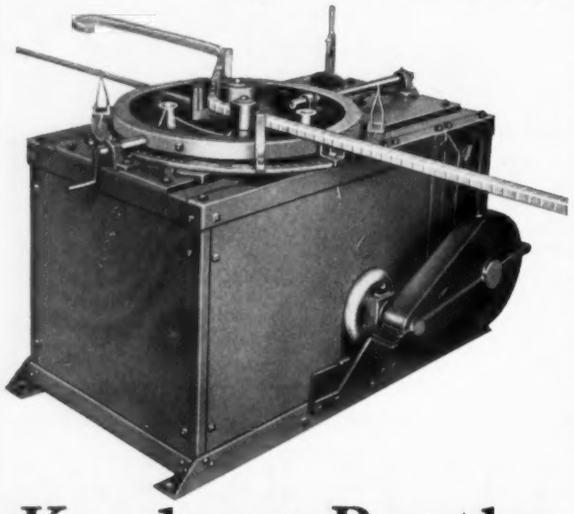
St. Louis—With the exception of standard structural shapes, purchasing of all warehouse items is in substantial volume. Wire and wire products are considerably more active, and fencing and accessories are moving in large volume. Advances in mill prices have served to stimulate ordering. November sales compared favorably with any preceding month this year and were approximately one-fourth larger than a year ago.

Cincinnati—Warehouse demand has not yet been affected by year-end influences, and continues close to the active October market. No effective date has yet been announced.

Seattle—Following mill advances, jobbers here Dec. 1 advanced warehouse prices 15 cents on bars, plates and shapes, and 20 cents on all grades of sheets and on bands and hoops. Portland dealers are expected to follow suit but the Oregon market has been open for some time, in some instances selling at 1 cent under Seattle. Some foreign steel has figured in this disorganized price schedule.

Kardong Four-way Bender

Model D-2



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Iron Ore

Iron Ore Prices, Page 93

Cleveland — Total shipments of iron ore from the upper lakes during November were 3,758,151 tons, compared with 7,301,284 tons in October and 1,557,494 tons in November, 1935. This represents an increase of 2,200,657 tons, or 141.30 per cent over November last year. The amount carried this year was 44,822,023 tons against 28,362,368 tons in 1935, an increase of 58.03 per cent.

Shipments from upper lake ports to the close of the season follow:

Port and Dock	1935	1936
Escanaba	1,823,655	2,392,958
Marquette	2,963,603	4,284,377
Ashland	3,068,784	4,623,618
Superior	10,276,176	16,236,502
Duluth	6,995,979	11,738,528
Two Harbors	3,234,171	5,546,040
Total	28,362,368	44,822,023

Steel in Europe

Foreign Steel Prices, Page 94

London—(*By Cable*)—Practically all iron and steelworks are sold for full production two to three months ahead and demand is expected further. Middlesborough pig iron is 6s higher. Export trade of necessity is restricted in view of heavy domestic demand. Imports of semifinished and merchant steel from the Continent have been increased. The tube trade is active, mainly for the domestic market. Tin plate is moving well and galvanized sheet exports are quiet.

The Continent reports satisfactory export trade, especially to South America and the Far East. Prices are firm and French domestic prices have been increased on all products.

Metallurgical Coke

Coke Prices, Page 91

With all 22 of the independent steelworks blast furnaces owned by four mills in the Pittsburgh district now in blast, a condition without parallel in the last seven years, the prospects of continuing good de-

mand for both by-product and beehive coke are excellent. Apparently foreseeing good business well into 1937, there still is a number of beehive coke ovens in the Connellsville region being made ready for production. The prices of $3.75 to $4 a ton, Connellsville, Pa., ovens, for standard beehive furnace coke and $4.25 to $4.50 for common foundry coke are firm and without quotable change.

Heavy shipments of coke for metallurgical and domestic use characterize the situation in practically all districts. Prices have been extended for December.

Refractories

Refractories Prices, Page 92

Effective with the first quarter, super quality fire clay brick will be advanced $7 per 1000 to $62, f.o.b. Pennsylvania works, first quality fire clay will be up $3 to $48, and second quality up $3 to $43 per 1000, f.o.b. Pennsylvania, Illinois, Kentucky, Maryland or Missouri base. First quality silica brick will be up $3 to $48, Pennsylvania works, and malleable bung brick will advance $12 per 1000 to $62, base. Announcement will be made this week on first-quarter prices for base brick, including dead-burned magnesite.

Semifinished

Semifinished Prices, Page 91

For the sixth consecutive week bookings of semifinished steel in the form of sheet bars and rerolling billets showed a material increase in the experience of Pittsburgh mills. The vast amount of forward buying has been instituted by the $2 a ton increase in these products, which becomes effective in first quarter. Additional to the $4 a ton increase in alloy billets, blooms and slabs, which will place the first-quarter market at $55, Pittsburgh, came the announcement last week of a $4 a ton increase in uncropped alloy ingots, advancing that market from the present $42 to $46 per ton, f.o.b. Pittsburgh.

Tin Plate

Tin Plate Prices, Page 90

Pittsburgh—Large tonnages of tin plate are being made up by mills at present for storage until shipment late this year or early in 1937. Most of this material is against 1937 releases by canmakers. In conformity with usual mill custom to make the December pay envelopes heavy, mills' rolling schedules are holding to a strong 95 per cent average for the industry, a rate which is supported by 94 per cent for the third successive week by a leading producer. Standard tin plate, which is unchanged at $4.85 for 1937 contracts, has not featured the heavy volume of specifications occurring in tin mill black through the past week. In the latter product a $4 a ton increase becomes effective Jan. 1 and advance buying has been heavy.

Nonferrous Metals

Nonferrous Metal Prices, Page 92

Cleveland—Outstanding in developments of nonferrous metal markets last week was the general decline in prices abroad, attributed generally to heavy selling of speculative holdings. This movement had no apparent effect on domestic markets but tended to indicate that domestic levels will advance no further over the balance of the year. Consumer demand here was generally light.

Copper—Sales continued light following fairly active business last month when total sales aggregated 88,177 tons. Producers held prices firm at 10.50 cents, Connecticut. Export copper eased to 10.62½c c.i.f. from around 10.77½c a week previously.

Lead—Producers had little difficulty balancing daily ore intakes on moderate business. Sentiment was buoyant on continued active consumption and improvement in the statistical position of the industry. Total stocks of lead declined 23,556 tons during October. Prices held at 5.05c, East St. Louis.

Zinc—Prime western held steady at 5.05c, East St. Louis, despite light consumer demand. Consumption is still active and unfilled tonnages on sellers' books are tending downward.

Tin—Prices dropped sharply on the publication of November statistics showing an increase of 4875 tons in world visible supplies. Consumers anticipate freer offerings and lower prices. Straits spot declined from about 52.37½ cents at the end of last week to 50.62½c.

Antimony — Activity continued dull with only small lot sales reported daily. Chinese spot advanced nominally at 12.75c, duty paid, New York, while American

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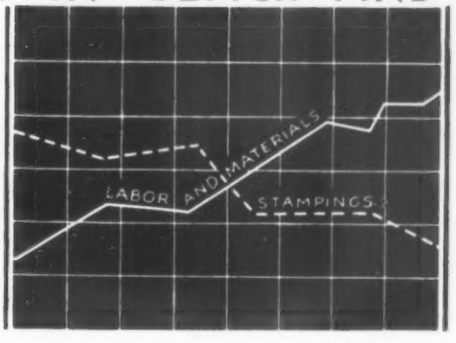

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spot advanced ⅜-cent to 12.75c on reports of a higher market in China.

Coke By-Products

Coke By-Product Prices, Page 91

New York—Following the usual practice, sulphate of ammonia price has been boosted 50 cents per ton to $26. This price is usually quoted from Dec. 1 to June 1. Demand is still strong and comparatively constant, and the supply is sufficient to fill requirements.

Financial

DIRECTORS of Otis Steel Co., Cleveland, have declared operative at the close of business Dec. 14, the plan of recapitalization under which prior preference shareholders will receive 1.28 shares of new convertible first preferred stock and one-half share of common stock for each share of prior preference stock surrendered for exchange. They also declared a dividend of $4.125 a share upon the convertible first preferred which will be issued in exchange under the plan, such dividend being equivalent to $5.28 a share upon the prior preference stock exchanged. Prior preference stock may be exchanged on or before Dec. 28.

American Rolling Mill Co., Middletown, O., has declared a dividend of $1.50 on the 6 per cent preferred stock to stockholders of record Jan. 1, payable Jan. 15.

United Engineering & Foundry Co., Pittsburgh, has declared a special dividend of $1.50, payable Dec. 22 to Dec. 12 record. The company has already paid four quarterly dividends this year, aggregating $1.75 per share.

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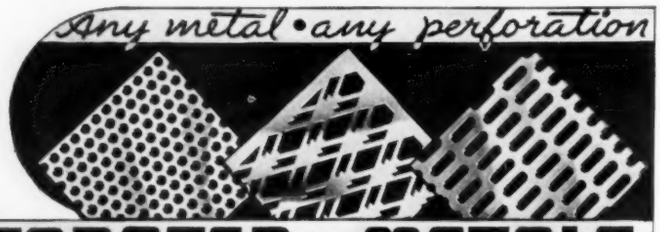

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Equipment

Cleveland—New price sheets on various lines of machine tools are appearing regulary, most quotations being higher by about 10 per cent, apparently to meet the rising trend in labor and material costs of builders. Machinery prices have been rising over the past six months, and many dealers look for further upward revisions in some lines after the first of the year. Little resistance to higher prices is encontered from buyers, most of whom are interested mainly in getting prompt delivery, although the latter is virtually impossible, deliveries ranging anywhere from six weeks to six months. Supplies of used machinery are slack, much of this equipment having been sold to European and other foreign buyers.

Chicago—Machinery and equipment markets show no letup in activity. November was a peak month in machine tool sales, and the December outlook appears equally good. Higher prices are in prospect for various types of machine tools, though this is a minor factor in stimulating demand. An improved market for machinery is in the making among the railroads, though little business has been placed lately by western shops. Some moderate orders have been received from eastern roads, but buying for this district likely will be deferred until next year. Approval of equipment appropriations sought by western carriers, as indicated by recent inquiries, will result in a substantial pickup in machinery purchases by railroads. Small tool demand continues brisk.

Construction and Enterprise

Illinois

CHICAGO — Caspers Tin Plate Co., 3424 West Forty-eighth place, will build plant addition here.

CHICAGO — General Iron & Metal Co. Inc., 231 South LaSalle street, has been incorporated by David Rosenmutter and associates, to deal in metals. Irwin S. Baskes, 231 South LaSalle street is correspondent.

CHICAGO — Chicago park district, Cook county, will construct additions and alterations to Lincoln Park power house. Project includes remodeling building, installing three boilers with total rated capacity of 750 horsepower and scrapping existing installation. Cost will be approximately $221,818, of which PWA is supplying $99,818 in the form of a grant.

EAST ST. LOUIS, ILL. — East St. Louis park district, St. Clair county, has PWA allotment of $28,636 toward construction of water supply system for park purposes, including wells, pump station and equipment, distribution system and appurtenances, two sewage septic tanks and an electric transmission system, estimated to cost $63,636.

HURST, ILL. — City plans construction of water system and sewage disposal facilities. Project includes erection of pumping stations, 100,000-gallon steel tank, installation of water mains, sewer pipe, two Imhoff tanks and sand filter beds.

LAKE VILLA, ILL. — Village will construct waterworks system, including well, pump house and equipment, elevated storage tank, distributing system and appurtenances. Cost will be approximately $40,000, toward which PWA has granted $18,000.

LEWISTOWN, ILL. — City plans extensions and improvements to existing water supply system. Project will include laying of force main and pipes, installation of semi-diesel engine-driven centrifugal pump. Allotment of $50,909 has been approved by PWA for this construction.

NEW BADEN, ILL.—Village has PWA allotment of $32,727 for construction of elevated tank, installation of additional meters, service connections and other improvements to its waterworks system.

ROXANA, ILL. — Village will drill wells, install two centrifugal pumps, electric motors and controls, two pump houses and 100,000-gallon steel storage tank on 125-foot tower. Cost is estimated at $45,453. Grant of $20,454 has been approved by PWA.

ST. DAVID, ILL. — Village will construct $70,909 water supply and distributing system. Project includes two wells, pump house and pumps, water mains and 80,000-gallon elevated storage tank.

WARREN, ILL. — Village plans installation of Imhoff tank, two sludge beds, dosing tank, four filter beds, laboratory building and operating equipment in sewerage system project. Project will cost about $80,000; grant of $36,000 has been approved by PWA.

WAUCONDA, ILL. — Village plans $30,909 improvements to waterworks system. Construction will include gravel wall well, two deep well turbine pumps, pump house, 75,000-gallon elevated steel storage tank and all necessary appurtenances; and repairs to present well and pump. Approval of $13,909 grant by PWA for this project, was recently announced.

New York

MAMARONECK, N. Y. — Westchester joint waterworks No. 1 will extend and improve water supply system for towns of Mamaroneck and Harrison in Westchester county by construction of pumping station, 500,000-gallon standpipe, and seven miles of cast iron water supply line. Cost is estimated at $418,770, of which PWA will supply $188,446.

NIAGARA FALLS, N. Y. — WPA has approved award of contract at $1,268,000 for sewage disposal system to Francis A. Canuso & Son, 804 South Twelfth street, Philadelphia.

PITTSFORD, N. Y. — City has PWA allotment of $21,818 for construction of water treatment plant and pumping station. Equipment will include two pumps, one electrically driven, the other gasoline driven, a zeolite water softener, and meters, gages, controls, etc.

PENFIELD, N. Y. — Town has PWA allotment of $20,403 toward construction of waterworks system estimated to cost $45,340. Project will include drilling of two wells, installation of pumping equipment and erection of pumphouse and steel standpipe with all necessary appurtenances.

New Jersey

SPOTSWOOD, N. J. — Borough has PWA allotment of $58,181 for construction of 28,900 feet of watermains, with necessary valves and hydrants and erection of 100,000-gallon steel tank to improve waterworks facilities.

Pennsylvania

AMBRIDGE, PA. — Spang, Chalfant & Co., Clark building, Pittsburgh, maker of pipes and tubes, will build an extension to its plant here.

PHILADELPHIA — S. K. F. Industries Inc. is building three one-story factory additions at Front street and Erie avenue, and one addition to plant at Third street and Glenwood avenue. Cost is estimated at $77,000. Turner Construction Co. is contractor.

SCHENLEY, PA.—Joseph S. Finch & Co., distillers, have let general contract for six-story plant addition, to be used for storage and distribution, to Frank Messer & Son, 2515 Burnet avenue, Cincinnati. Cost is estimated at $250,000.

Ohio

CLEVELAND — Burdett Oxygen Co., 3300 Lakeside avenue, is building plant, 10,000 square feet in area, at 4180 Bradley road, for the manufacture of acetylene and propane gas. Cost is estimated at $100,000. William H. Loveman is president.

CLEVELAND — Republic Steel Corp., Republic building, is having plans prepared for construction of continuous hot and cold sheet strip mill at an estimated

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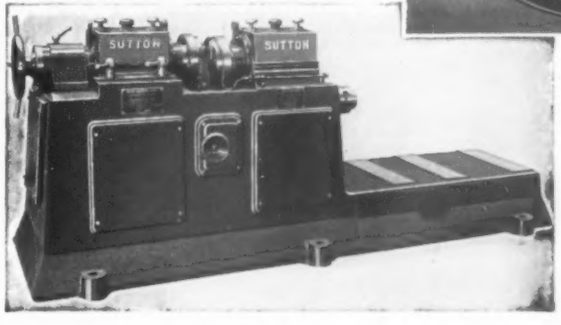

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cost of $15,000,000. Work has been started on foundations and bids for erection of mill will be taken soon. Albert Kahn, 345 New Center building, Detroit, is architect and engineer. C. M. White is vice-president in charge of operations.

FINDLAY, O. — Lima Crude Refining Co. Inc. will install three gathering units to convey crude oil from the fields to its plant on Bell avenue, here. Paul Gallant will be supervisor. Company offices are at 122 West Front street.

MANSFIELD, O. — City has completed preliminary plans for construction of elevated water tank and improvements to distribution system. Cost is estimated at $181,000. Murray D. Shaffer is service director.

MENTOR, O.—Village plans construction of water plant, including wells, pumps, 10,000-gallon elevated tank, water softening equipment and distribution system. Total cost is estimated at $120,000. Federal aid has been applied for. Paul Elwell, 5005 Euclid avenue, Cleveland, is engineer.

MINERVA, O. — Board of public affairs, Margaret Wright, clerk, is taking bids, due Dec. 15, for construction of power plant improvements, including 1500-KW turbo-generator. Ralph Hadlow, 700 Prospect avenue, Cleveland, is consulting engineer. (Noted Nov. 23).

SYDNEY, O.—City has retained engineer to make preliminary survey for waterworks construction, including erection of 500,000-gallon tank and distribution system. Survey to be completed by Dec. 28. Floyd E. Browne, Marion building, Marion, is engineer.

YOUNGSTOWN, O. — Republic Steel Corp. plans expenditures for building additions and machinery at its pipe and hot strip mills here.

Michigan

BENTON HARBOR, MICH. — W. A. Preston is completing plans for construction of addition to factory building in St. Joseph, Mich. Cost is estimated at $15,000.

DETROIT — United Drill & Tool Corp. has been organized by Richard A. Forsyth, 2822 Union Guardian building, to deal in tools.

DETROIT — General Fuel Engineering Inc., 3610 Barium Tower, has been formed by Milton Koblin, 3342 Chicago boulevard, to deal in machinery.

DETROIT — Radius Tool & Die Co., Hamtramck, has been incorporated by Casimer Fortunski, 11363 Lumpkin street, to manufacture tools and dies.

DETROIT — National Metal Products Corp., 903 Hammond building, has been formed by Thomas O'Brien, 325 Piper boulevard, to manufacture metal products.

DETROIT — Peerless Cement Corp., 1144 Free Press building, plans erection of separator building on West Jefferson avenue. Giffels & Vallet Inc. L. Rossetti, are associated engineers and architects.

MIDLAND, MICH. — City, Anna E. Coons, clerk, will take bids until Dec. 14 for construction of addition to water-softening and filtration plant. Shoecraft, Drury & McNamee, Ann Arbor, are engineers.

PINCONNING, MICH. — City has PWA grant of $22,500 toward construction of $50,000 extensions and improvements to existing water supply system.

PONTIAC, MICH. — Pontiac Varnish Co. has permit for construction of $29,000 addition to plant. Harlan S. Smith is general contractor.

PONTIAC, MICH. — Sunset Coach & Trailer Corp. has been formed by H. H. Smart, 19 West Lawrence street, to manufacture trailers.

Indiana

GRIFFITH, IND. — Keen Foundry Co. is building power house and addition to foundry at a cost of approximately $15,000.

Alabama

LEEDS, ALA. — Universal Atlas Cement Co., 208 South LaSalle street, Chicago, has completed engineering plans for construction of wet-process cement mill adjacent to its plant here. Cost is estimated at over $1,000,000.

Maryland

BALTIMORE — Calvert Metal Mfg. Co., 130 South Calverton road, has plans in progress for addition to plant.

Florida

DUNEDIN, FLA. — Citrus Concentrates Inc. is constructing plant, main building 74 x 200 feet and wing 40 x 90 feet. Equipment for extracting and concentrating citrus juices will be installed.

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JACKSONVILLE, FLA. — City has PWA allotment for construction of filtration plant. Project includes installation of aerating equipment, pumps and zeolite softening equipment. Cost is estimated at $76,000.

Georgia

ATLANTA, GA. — Walker Electrical Co., 526 Means street, has acquired site on Antone street for plant expansion.

CRAWFORDVILLE, GA. — City plans construction of $32,727 waterworks system, including deep well, 75,000-gallon elevated tank and distribution system. Grant of $14,727 has been approved by PWA.

NEWNAN, GA. — City will install motor-driven pumping unit and additional supply mains as improvement to waterworks system. Cost will be approximately $28,526. Grant of $12,837 has been secured from PWA.

WAYCROSS, GA.—Satilla Rural Electric Corp., Chester Lake, will construct 450 miles of rural transmission lines in Ware, Pierce, Bacon, Appling, Coffee and Jeff Davis counties at an estimated cost of $500,000. Funds will be provided by REA. J. C. Oglesby is extension engineer.

Kentucky

ASHLAND, KY. — Ashland Refining Co. has plans to build an inclined river loading platform along the left bank of the Big Sandy river.

ASHLAND, KY. — Standard Oil Co. of Kentucky, Louisville, Ky., will build an inclined tramway and lay two six-inch pipe lines on the left bank of the Ohio river here.

GUTHRIE, KY. — City has PWA allotment of $11,818 for construction of water softening plant.

DAYTON, KY.—Perry & Derrick Co., 908 Central avenue, manufacturer of paints, oils and varnishes, has plans for four-story addition to plant here. Cost, with equipment, is estimated at over $70,000. E. C. Landberg, 114 Garfield place, Cincinnati, is architect.

LOUISVILLE, KY. — Kentucky Consumers Oil Co. will build a floating dock on the left bank of the Ohio river to permit unloading of petroleum products from barges.

RICHMOND, KY. — Richmond Water & Gas Corp. has acquired site for erection of 500,000-gallon standpipe; plans modernization of water system, construction of pump house.

VANCEBURG, KY. — City has PWA grant of $1636 toward construction of waterworks improvements estimated to cost $3636. Project includes drilling well, installing pump, erecting pump house, chlorinator and 150-gallon steel tank.

Tennessee

FAYETTEVILLE, TENN.—Town plans construction of $149,000 electric distribution system, including outdoor, automatic substation and primary feeders. Allotment of $76,050 has been approved by PWA.

LEWISBURG, TENN. — City will spend $50,909 for construction of extension to sewage disposal plant, including lift pump and ¼-acre trickling filter.

SMYRNA, TENN. — Town will spend $45,455 for construction of waterworks system, including laying mains, drilling well and installing pump, erection of 75,000-gallon elevated steel tank and tower, pump house, service pump and chlorinator. Allotment for this purpose approved by PWA.

West Virginia

WHEELING, W. VA.—Center Foundry & Machine Co. has permit for construction of $17,000 addition to its plant at Warwood.

Virginia

HERNDON, VA. — City plans construction of $90,909 sewer system, including disposal plant. Grant of $40,909 has been allocated by PWA.

MIDDLEBURG, VA. — Town has PWA grant of $18,000 toward construction of sewerage system with two points of disposal, estimated to cost $40,000.

Missouri

EAST PRAIRIE, MO. — City has PWA allotment of $36,363 for erection of 75,000-gallon steel tank on 125-foot tower, installation of pump and drilling of 200-foot well.

KANSAS CITY, MO. — Union Wire Rope Corp., 2030 Manchester avenue, has started construction of plant addition,

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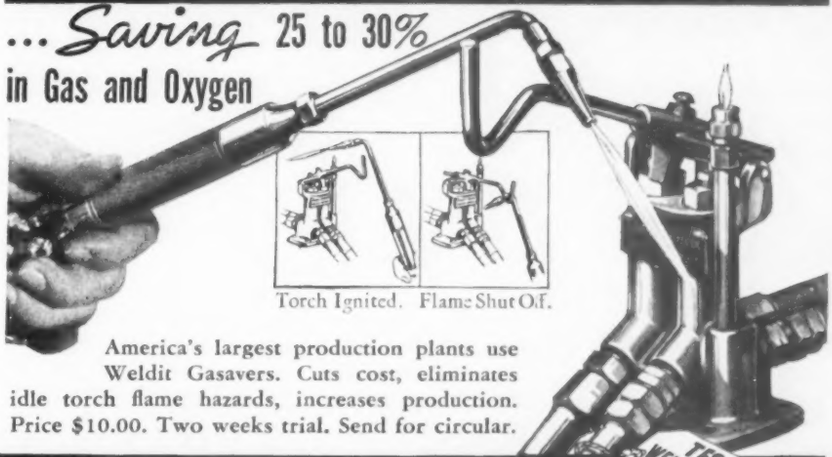

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LAMAR, MO. — City will improve public sewer system by constructing sewage disposal plant with outfall sewer and connecting mains. Cost is estimated at $66,550, of which PWA will supply $29,948.

STANBERRY, MO. — City plans construction of municipal electric power plant and distribution system. Two 150-horsepower diesel engines will turn two 100-kilowatt generators to furnish power for waterworks, street lighting system, and general distribution. Cost is estimated at $61,607; grant of $32,500 approved by PWA.

Arkansas

HOT SPRINGS, ARK. — Arkansas Power & Light Co., Pine Bluff, has started clearing site for third hydro-electric dam and power project on Ouachita river north of here. Initial capacity of plant will be 31,700-horsepower. C. S. Lynch, Pine Bluff, is chief engineer. Cost is estimated at $4,000,000.

Texas

BRENHAM, TEX. — City plans construction of municipal lighting system. Equipment will include four 250-kilowatt diesel-driven generator units with auxiliary equipment. Cost of entire project is estimated at $310,000, of which PWA will furnish $140,000 in form of a grant.

EDCOUCH, TEX.—City votes Dec. 14 on bond issue of $60,000 for construction of water and electric systems.

HOUSTON, TEX. — International Harvester Co., 4610 Navigation street, has acquired tract corner Navigation and Lockwood streets, for addition to plant facilities. Cost is estimated at $100,000.

Wisconsin

EAU CLAIRE, WIS. — City will construct additions to waterworks system, including two wells equipped with 1750-g.p.m. deep-well turbine pumps. Cost is estimated at $56,000; PWA has allocated $25,200 for this project.

Minnesota

LEWISTON, MINN. — Village will spend $59,500 for construction of sewage system and treatment plant, including erection of building, installation of clarifier and digester tanks, rock filter, sludge bed and chlorinator.

Kansas

EUDORA, KANS. — City plans to spend $56,364 on construction of complete waterworks system, including 50-foot well, pumps, 50,000-gallon steel storage tank on 80-foot tower. Grant of $25,364 has been approved by PWA.

LE ROY, KANS. — City will construct sanitary sewer system and disposal plant, including primary treatment facilities consisting of screening chamber, Imhoff tanks, sludge beds with connecting pipes and other appurtenances. Cost is estimated at $40,000, of which PWA will supply $18,000.

VERMILLION, KANS. — City will construct complete waterworks system at a cost of $40,993. Work will include drilling of well, installation of motor-driven pump, erection of pump house and 50,000-gallon steel overhead tank. Federal aid of $18,447 has been granted.

South Dakota

BRANDT, S. DAK. — Town has PWA allotment of $16,363 for construction of waterworks system, including well, mains, and water tower.

FAULKTON, S. DAK. — City will construct sewage treatment plant consisting of Imhoff tank and house, trickling filter, sludge drying bed and secondary settling tank. Cost is estimated at $18,182, for which PWA allotment has been approved.

HERMOSA, S. DAK. — Town will improve waterworks system by installation of diesel motor and 25-g.p.m. pump. Cost is estimated at $3090; PWA to supply $1390.

MADISON, S. DAK. — City has PWA allotment for construction of $27,273 improvements to waterworks system.

SISSETON, S. DAK. — City plans to spend $80,000 for construction of improvements to waterworks system. New supply will be tapped and pumped six miles to city.

Iowa

ANAMOSA, IOWA — Jones county rural electric cooperative has REA allotment of $210,000 for construction of transmission lines in Jones and Jackson counties to serve 550 customers.

CENTERVILLE, IOWA — Iowa Southern Utilities Co. has been granted franchise for construction of rural trans-

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mission lines in Keokuk, Wapelo and Washington counties. About 53.6 miles of lines estimated to cost $45,000.

DES MOINES, IOWA — Iowa Light & Power Co. has been granted franchise by state railway commission for construction of 42.25 miles of transmission lines in Madison and Dallas counties. Cost is estimated at $32,500.

GLIDDEN, IOWA — Glidden rural electric co-operative has franchise from state railway commission for construction of 66 miles of transmission lines in Carroll county. Cost is estimated at $65,000.

GRUNDY CITY, IOWA — Grundy county rural electric co-operative has REA allotment of $100,000 for construction of 98 miles rural transmission lines in Marshall, Grundy, Blackhawk and Hardin counties.

MASON CITY, IOWA — People's Gas & Electric Co. has been granted franchise by state railway commission for construction of 72 miles rural transmission lines in Floyd, Cerro Gordo and Worth counties. Approximate cost is placed at $50,400.

ONAWA, IOWA — Monoma county rural electric co-operative has been granted franchise for construction of 13½ miles rural transmission lines in Monoma county. Approximate cost is $14,000.

Nebraska

SCOTTSBLUFF, NEBR.—Spahn Transfer Co. plans erection of three-story warehouse, 80 x 200 feet, for cold and dry storage. Cost is estimated at $125,000. David Spahn, Scottsbluff, is owner.

Montana

HELENA, MONT. — State water conservation board has postponed opening of bids for water conservation projects in Madison and Judith Basin counties from Dec. 5 to Dec. 19.

Idaho

BOISE, IDAHO—Consolidated Freight Lines Co. has purchased eight-acre site for erection of terminal. W. D. Miller is superintendent.

LEWISTON, IDAHO—Clearwater Light & Power Association is seeking federal financing for electrification of farms in Nez Perce and Clearwater counties. P. J. Miller, Lewiston, is president.

Pacific Coast

PORTLAND, OREG.—Pacific Co-operative Poultry Producers association is receiving bids for construction of 100 x 100-foot storage and mill structure and five-story grain elevator. Lee A. Thomas is architect.

THE DALLES, OREG.—Parker-Schram Co., Couch building, Portland, has been awarded general contract for construction of petroleum wharf at the public port terminals.

BELLINGHAM, WASH.—Gilmore Oil Co. has applied for city permit to erect storage tanks at Tenth and Taylor streets.

ROCKFORD, WASH.—J. R. Saunders, implement dealer, has begun construction of machinery warehouse adjoining recently purchased plant building.

SEATTLE—Northwest Lead Co., 1742 Fourth street, will build bag house, steel construction, at plant 2700-26 Sixteenth avenue S. W. Austin Co., Dexter Horton building, has general contract.

SEATTLE — Hydroelectric plant of Puget Sound Power & Light Co. at Electron was seriously damaged in a landslide. Repairs will be undertaken at once.

SEATTLE—City Light has applied to WPA for $132,745 for improvements at Skagit river power site, including rebuilding camp water and sewerage systems.

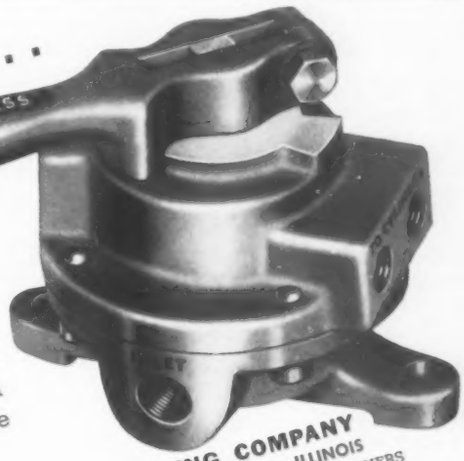
SEATTLE—General Construction Co., Colman building, has general contract for rebuilding Colman dock and ferry terminals at a cost of $250,000. Loveless & Fey are architects.

SPOKANE—Purchase of Gilt Top-Spokane Brewing & Malting Co. and merging with Goetz Breweries Co. is announced by Frank McKevitt, general counsel. Plans include modernization of Gilt Top plant at a cost of $250,000.

TENINO, WASH.—City council is negotiating bond issue for purchase and improvement of waterworks system for municipal plant.

Canada

WINDSOR, ONT. — Ford Motor Co. of Canada will build $300,000 addition to its plant in 1937 and install machinery to the value of $1,400,000.



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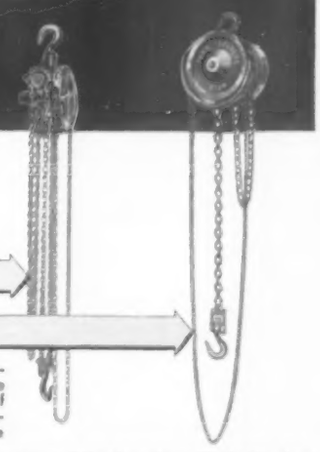

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